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THE RESTRICTION OF THE CORONARY FLOW AS A GENERAL FACTOR IN HEART FAILURE

CHAIRMAN'S ADDRESS

M. B. VISSCHER, M.D.

MINNEAPOLIS

An adequate supply of blood to maintain normal respiration of the cardiac musculature is the first requirement for a functionally normal heart. The ability of the heart to increase its work output in exercise and under other circumstances depends first and foremost on the capacity of the coronary system to supply blood to the heart muscle.

Only the strictly coronary types of heart failure are due to inadequate coronary flow as a first cause, but, as will be more apparent later, in all forms of progressive failure the restrictions in the total possible coronary flow limit the work capacity and therefore the life of the heart and in the last instance of the patient. So long as the oxygen supply to the heart can increase with its needs, that organ can continue to function, barring ventricular fibrillation, although it may function very inefficiently and waste a large share of its energy; but when the oxygen supply cannot keep pace with the need for it a rapid downhill course is described.

It the past the greater share of interest in the coronary circulation in heart disease has centered around the problems of closure of certain of the coronary vessels. These are the most dramatic episodes in which the coronary vascular system is involved, but there are other equally important alterations in the coronary blood supply which deserve attention and form the basis of this discussion. These other mechanisms are of two sorts. The first is a gradual and progressive narrowing or closure of coronary vessels with a concurrent decrease in blood supply to the musculature of the heart, and the second is the restriction in the coronary flow produced by elevations in pressure in those cavities into which the coronary venous blood drains.

There are certain aspects of the progressive coronary closure problem which are amenable to experimental study. Since this problem is of great interest it will be considered first. It is difficult to reproduce exactly the conditions occurring in progressive coronary sclerosis in adequately controlled physiologic experiments. Numerous studies have been made of the effect of completely closing by ligature or by sclerosing solutions larger or smaller areas of the coronary vascular bed. These procedures imitate to a degree the conditions existing in acute coronary thrombosis but they do not shed any light on the effects of gradual occlusion of the coronary bed.

However, experiments with drugs which have specific coronary constrictor action have a bearing in this connection. It was shown by Melville and Stehle [1] and has been confirmed by others, including myself, that the pitressin component of the posterior pituitary has a powerful coronary constrictor effect. We have found that as little as 0.01 cc. of pitressin per kilogram of body weight injected intravenously into the dog reduces the flow through the coronary arteries as much as 80 per cent. It is of interest to note the consequences of this coronary constriction on the dynamics of heart muscle. If one measures the volume of the ventricles of the dog's heart in the heart-lung preparation, one finds that, if the work of the heart is kept constant, the addition of very small quantities of pitressin produces a great increase in the diastolic ventricular volume. This increase in the diastolic ventricular size is a reflection of what might be called the weakness of the heart muscle. The heart dilates only when it is unable to carry its load without so doing. It is well known that the energy output of the heart muscle depends on diastolic fiber length and that when a heart dilates under constant load that dilatation is due to the fact that the ventricle is unable to eject as much blood per beat as is delivered to it, and therefore increasingly larger quantities of residual blood remain within the ventricle at the end of systole. If the quantity which enters during filling remains the same, the diastolic ventricular volume must progressively increase until such a state is reached in which enough energy can be put to useful work by the contracting ventricle to eject a quantity of blood in systole exactly equal to that delivered to it in diastole. Thus it may be said that, when a heart dilates, a compensatory mechanism is being brought into play since the progressive distention of the ventricles results directly in an increased energy liberation in systole.

Now in the case of the ventricular dilatation under the influence of pitressin we have to deal, it would seem, with a heart muscle which has become less capable of doing work because it is working under partially anaerobic conditions. Its blood supply, and consequently its oxygen supply, is diminished and an oxygen debt develops.

The alternative to the view that decreased oxygen supply leads to diminished efficiency is that the completely anoxic heart muscle is unable to liberate energy for any considerable period and that therefore the heart as a whole becomes less able to do work when parts

From the Department of Physiology, University of Minnesota Medical School.

Read before the Section on Pathology and Physiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Melville, Y. I., and Stehle, R. L.: The Antagonistic Action of Ephedrine (or Adrenalin) on Coronary Constriction Produced by Pituitary Extract and Its Effect on Blood Pressure, J. Pharmacol. & Exper. Therap. **42**: 455 (Aug.) 1931.

of its musculature are inadequately supplied with oxygen. As far as the practical consequences are concerned, the argument on this point is of but little importance, because in any case it is universally agreed that when the heart muscle is partially anoxic it becomes less capable of doing work and that, when it is completely anoxic, after a short time it is unable to do any work at all.

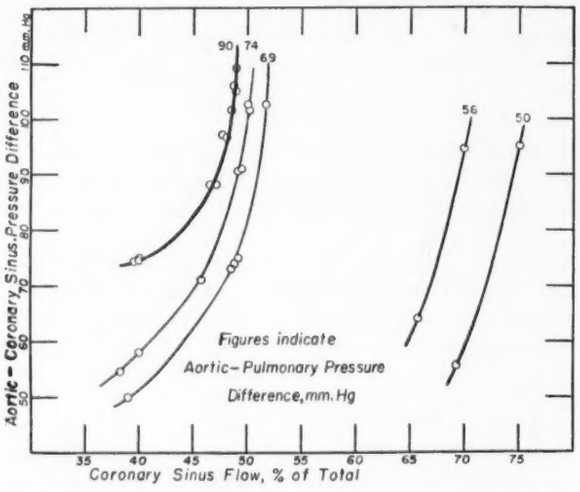

Chart 1.—Partition of coronary venous flow between the thebesian veins and the coronary sinus in relation to pressure gradients.

The effect of pitressin seems to imitate quite closely over a short period of time the changes that occur with longer duration when the coronary arterial channels are narrowed by arteriosclerosis. The main interest in the observations on pitressin surround the fact that the ventricular dilatation of coronary sclerosis can thus be reproduced.

A lucky misfortune provided me with an opportunity to study the influence of another kind of coronary occlusion on cardiodynamic phenomena. In some work on the metabolism of the completely isolated mammalian heart it was necessary to employ an artificial oxygenator in place of the lungs. Consequently, following the instructions of Bayliss, Fee and Ogden, in meticulous detail, my associates and I built an oxygenator out of cast aluminum. On passing blood which had gone through this oxygenator through the completely isolated dog's heart, we found that the coronary flow progressively diminished and that the heart dilated rapidly so that within from thirty to ninety minutes it was enormously distended and unable to eject any blood, and ventricular fibrillation ensued. On analysis of the possible reasons for this rapidly progressive failure, we [2] found what might have been predicted, that aluminum hydroxide was formed when blood came in contact with aluminum metal and that the same kind of rapid failure could be reproduced by the introduction of from 100 to 200 mg. of aluminum hydroxide in colloidal suspension in physiologic solution of sodium chloride into the blood supplying the left side of the heart and thus the coronary vessels. Aluminum hydroxide in much higher concentration has no unfavorable effect on the contraction of the amphibian heart, in which there is no coronary system, and it has no deleterious effect when added to salt solutions entirely free from blood perfusing the rabbit's heart in a Langendorff preparation. It is of incidental interest to note that when such colloidal aluminum hydroxide is introduced into the circulatory system in such a way that it has to pass through the lung capillaries before reaching the left side of the heart it likewise has no observable effect on the heart. The pulmonary capillaries or arterioles apparently serve as very effective filters for the particles which appear to be responsible for the closure of the smaller coronary vessels with resulting restriction in coronary flow.

The formation of aluminum hydroxide by corrosion in the heart oxygenator was perhaps a misfortune as far as the experiments for which the oxygenator was built were concerned, but the mishap provided us with a method by which we might study the effects of progressive coronary closure of this type on the dynamics of the heart muscle. It was found first of all, as already noted, that the heart dilated very rapidly and measurements of oxygen consumption and work showed that the energy liberation fell off greatly, indicating that in this particular situation some regions of heart muscle which were not supplied with any oxygen at all became effectively nonfunctional. The efficiency of the heart as a whole declines but not nearly so much as would have been anticipated from the enormous size of the ventricles. Thus we see that, when cardiac dilatation is essentially the result of restriction in the coronary blood flow, the heart muscle is unable to liberate as much energy in contraction as it could when the blood flow was normal.

There are undoubtedly regions between points of complete anoxia and of fairly normal oxygen supply where the situation is intermediate. In these regions in the heart muscle the properties of rhythmicity and conductivity as well as work capacity are altered, and some of the disorders of excitation and conduction in situations in which the coronary flow is restricted, but not cut off, as evidenced by changes in the electrocardiogram, are due to the situation which is described.

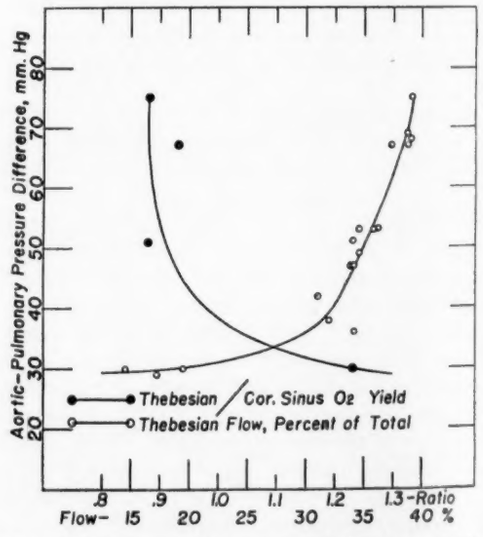

Chart 2.—Relative oxygen yield of coronary sinus and thebesian venous blood in relation to pressure and flow factors.

There has been a somewhat prolonged controversy between two groups of workers as to the essential changes in cardiodynamics in the failing heart. One group, including Ruhl and Katz and their collaborators, has held that in all types of failure the essential change is simply a decrease in energy libertion in contraction. The contrary view, to which I subscribe, is that, unless

2. Beland, I. L.; Moe, G. K., and Visscher, M. B.: Use of Aluminum Metal in Contact with Blood in Perfusion Systems, Proc. Soc. Exper. Biol. & Med. **39**: 145 (Oct.) 1938.

there is a restriction in coronary blood flow to certain parts of the myocardium, spontaneous failure is associated simply with a decrease in the proportion of energy put to useful work, that is, in engineering terms, the mechanical efficiency. That this occurs has been shown by numerous investigators using amphibian hearts without coronary circulation and various species of mammalian hearts under a variety of conditions.[3] The proponents of the first theory have based their conclusions mainly on observations on the mammalian heart working under unphysiologic conditions or using unsound energy metabolism methods. It is my opinion that those investigators with the completely isolated heart in which the coronary blood flow was progressively declining were studying mainly failure due to coronary occlusion. This opinion is based on the fact that in my own experience their results can be duplicated only when the coronary blood flow diminishes for one reason or another. However, this is a very important type of failure and deserves careful study because of its importance to clinical problems.

The second type of mechanism controlling flow which must be considered in connection with the coronary blood flow in the failing heart has been referred to as the pressure gradient mechanism. It is on this point that we have conducted a considerable number of experiments within the past year in order to determine which factors are of greatest importance in this connection. We have worked with the completely isolated dog heart fed blood from a reservoir after passing it through an artificial oxygenator the surfaces of which were carefully lacquered to prevent contact of blood with material which might corrode and obscure the results. We have in general collected one fraction of the venous blood with a suitable cannula fixed in the coronary sinus and have collected that fraction of the coronary venous blood which enters the right side of the heart via the thebesian veins by allowing the right ventricle to pump this blood against an artificial resistance through a stromuhr. No other blood was allowed to enter the right side of the heart. The left side of the heart was fed through a cannula in the left antrum, and the ventricle was made to pump against an artificial resistance of the type usual in the heart-lung preparation. Thus the arterial pressure could be varied at will and the pressure within the right side of the heart could likewise be controlled, and by fixing the level of the coronary sinus outflow tube the sinus pressure could also be controlled. Experiments of this sort have been performed previously by Katz and by Johnson and Wiggers,[4] but in neither case were all conditions appropriate for the demonstration of the relationships which we desired to study. In the experiments of Katz, the coronary arteries were fed from a system whose pressure was fixed arbitrarily, and in the experiments of Johnson and Wiggers the thebesian blood flow was not measured.

The flow of coronary blood, like any other fluid in a hydraulic system, depends on the existence of a pressure gradient. This pressure gradient, so far as the coronary system is concerned, is measured by the differences in pressure between the aorta, that is the orifices of the coronary arteries, and the coronary sinus and right ventricle. The importance of this pressure gradient in determining the coronary blood flow has not been given adequate attention. It will be pointed out in the course of this paper that these differences in pressure are of the highest importance and must be reckoned with if one is to understand the pathologic physiology of clinical heart failure.

The results of a typical experiment by Moe, Wood, Keys and Visscher [5] are shown in chart 1. Here the percentage of the total coronary flow emerging from the sinus is plotted against the pressure difference between the aorta and the coronary sinus. These values were measured at a series of five values for the aorta-pulmonary artery pressure difference. It will be noted that the greater the aorta-pulmonary artery pressure difference the greater the thebesian flow and the less the coronary sinus flow. When the aorta-pulmonary artery pressure head is less than 60 mm. of mercury the thebesian flow falls off greatly. The aorta-coronary sinus pressure difference likewise has a determining influence on the partition. The higher the aorta-coronary sinus pressure difference, other factors being held constant, the greater the coronary sinus flow.

Partition of Total Outflow from Each Coronary Artery

Artery	Drainage	Per Cent Average
Left circumflex	Coronary sinus	38
	Right thebesian	48
	Left thebesian	14
Anterior left descending	Coronary sinus	42
	Right thebesian	51
	Left thebesian	7
Right circumflex	Coronary sinus	1
	Right thebesian	92
	Left thebesian	7

From Katz, Jochim and Weinstein.[6]

The effects of this relationship can be made clearer by showing their effect on the contribution made by each fraction to the oxygen used by the heart. In chart 2, from the same authors, are shown the inverse relationship between oxygen yield and volume flow through each channel. From this experiment and from others like it, one can observe that when the pulmonary pressure rises, thus restricting the thebesian flow, the oxygen content of the thebesian venous blood becomes consistently less than that of the coronary sinus blood. Thus the parts of the heart muscle which have to obtain their oxygen from blood emptying into the thebesian channels on the right side will be relatively anoxic.

It is of interest to note which portions of the heart will be so affected. Katz, Jochim and Weinstein [6] have shown, as recorded in the accompanying table, that the right circumflex coronary artery, which supplies mainly the right ventricular muscle, drains almost exclusively, 92 per cent on the average, through the right thebesian system into the right side of the heart. Thus it is obvious that the right ventricle will be most seriously affected by a restriction in thebesian flow.

The left heart thebesian flow is of considerably less importance. Approximately 10 per cent of the coronary blood drains through these channels, and our observations show that about 7 per cent of the total oxygen used by the heart is yielded by left thebesian blood. Therefore elevations in left intraventricular pressure will have little direct effect on coronary blood flow by this mechanism. Of course, indirectly, through the

3. Moe, G. K., and Visscher, M. B.: The Mechanism of Failure in the Completely Isolated Mammalian Heart, Am. J. Physiol. **125:** 461 (March) 1939.

4. Johnson J. R. and Wiggers C. J.: The Alleged Validity of Coronary Sinus Outflow as a Criterion of Coronary Reactions, Am. J. Physiol. **118:** 38 (Jan.) 1937.

5. Moe, G. K.; Wood, E. H.; Visscher, M. B., and Keys, A.: To be published.

6. Katz, L. N.; Jochim, K., and Weinstein, William: The Distribution of the Coronary Blood Flow, Am. J. Physiol. **122:** 252 (April) 1938.

effect on aortic and coronary arterial pressure, the coronary flow is majorly determined by the pressure the left ventricle develops. The left ventricle develops the head of pressure for coronary flow and its importance is inverse to the right ventricular pressure.

Blood can leave thebesian channels into the left ventricle only during diastole, because only then is the pressure gradient suitable, but flow can occur into the right ventricle both in systole and in diastole because there is a positive pressure gradient at all times. Increases in right ventricular pressure are therefore doubly important to coronary outflow.

The restriction in right thebesian flow observed when the pulmonary arterial pressure is increased seems to be due to two factors. First the flow is apparently decreased during systole because the pressure head is diminished, and second the flow also probably diminishes in diastole because the right ventricle does not empty itself as completely in systole and the subsequent diastolic intraventricular pressure is elevated above what it would be with lower pulmonary artery pressures.

The observations on coronary flow and oxygen yield are of interest in their own right and permit one to make certain probable deductions of clinical importance, as have already been intimated; but the more critical demonstration of their importance must rest on observations on the effects of coronary pressure gradient changes on the processes of failure itself. Experiments have been performed with the dog's heart in which the rate of dilatation of the ventricles was studied at several values of pulmonary arterial pressure. The results of a typical experiment are given in chart 3. The procedure was to measure the rate of dilatation with a Henderson cardiometer. Isolated hearts show a slow progressive dilatation which has previously been subjected to careful study under other circumstances by Peters and Visscher.[7] The rate of this failure was measured at progressively increasing pulmonary arterial pressures. Over the course of several hours, three series of observations were made. The numbers alongside each point on the chart indicate the sequence in which the observations were made. It will be obvious that the rate of failure in this preparation is a definite function of the pulmonary pressure and that, as the experiment proceeds, the deleterious effects of high pulmonary pressure are aggravated enormously.

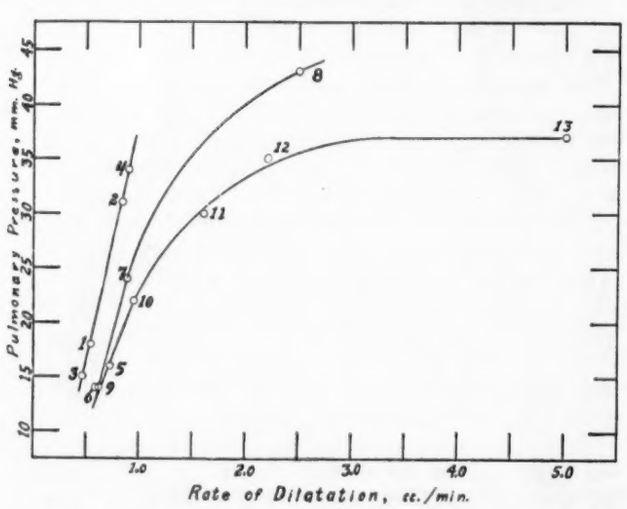

Chart 3.—The rate of spontaneous ventricular dilatation (failure) as determined by time and the pressure factors controlling thebesian flow.

Thus the direct experiment proves that elevation in right intraventricular pressure is a factor accelerating failure, and it seems most likely that this effect depends on the restriction in coronary flow which occurs.

In conclusion I should like to point out again the familiar fact that the left side of the heart can carry enormous loads, as in hypertension and in valvular disease, for many years, whereas when the right ventricle works against increased loads the heart fails rapidly.[8] The physiologic mechanism of this important difference between the adaptive capacities of the two ventricles seems to be bound up primarily with the differences in the effects of elevated intraventricular pressures in the two sides of the heart on coronary flow. Independent of all other factors, the decreases in the coronary vascular pressure gradients produced by elevations of either right atrial (coronary sinus) or right intraventricular (thebesian) pressures have directly deleterious effects on the work capacity of the heart, greatly increasing the rate of failure.

7. Peters H. C., and Visscher, M. B.: The Energy Metabolism of the Heart in Failure and the Influence of Drugs on It, Am. Heart J. **11**: 273 (March) 1936.

8. It has been noted by S. A. Levine (Clinical Heart Disease, Philadelphia, W. B. Saunders Company, 1936, p. 65) that patients with mitral stenosis have a better life expectancy if there is a coincident hypertension. It will be evident from the observations here reported that elevated aortic pressure will increase the coronary flow through the right ventricle. Since mitral stenosis leads to right heart failure, and improved coronary flow would logically be expected to delay such failure, the hypertension might exert its favorable effect through this mechanism.

DIAGNOSIS AND TREATMENT OF DISEASES OF THE EAR IN CHILDREN

HORACE JAMES WILLIAMS, M.D.
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The highest percentage of both catarrhal and suppurative otitis media occurs in children before the fifth year and it is obvious that, if progress is to be made in the prevention of deafness, emphasis must be placed on the diagnosis and treatment of otitis media in this age group.

For the sake of clarity let the age of infancy be up to 1 year. At that age the anatomy of the ear differs from that of the older child.

The auditory tube is short, being from 16 to 18 mm. long, but the breadth is equal to that of the adult. The pharyngeal orifice is on a level with the floor of the nose, and infected material consequently from the nose finds easy access to the tube. There is no angle or isthmus, and the tube is practically horizontal. The muscles are not well developed.

In the infant the tympanic membrane is thicker and more elastic than in the older child. The membrane often bulges when the infant cries.

The external ear also differs. The osseous external auditory canal consists only of a bony ring which gradually grows outward by the deposit of bone on its outer surface. The drum is almost horizontal and the walls of the membranocartilaginous portion are studded with fine hairs, which make examination of the tympanic membrane difficult.

During the second year the osseous canal begins to assume the adult form. The lumen of the canal becomes larger, and the tympanic membrane becomes more hori-

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zontal and more easy to examine. The auditory tube also begins to take on adult characteristics.

Of acute suppurative otitis media associated with acute infections of the upper respiratory tract and acute infectious diseases such as scarlet fever and measles, one sees two widely different forms depending on the rapidity of the invasion.

In the first form the invasion of the tympanic cavity by the infection accompanies the invasion of the nasopharynx by the infectious disease and the symptoms develop rapidly. There is a rise of temperature and the pain in the ear is severe. The tympanic membrane is red and bulging in the posterior half. If it is seen early and incised, a hiss is often heard as the air escapes from the tympanic cavity. When it is seen a few hours later and incised a serosanguineous fluid is released. The pain is usually relieved and the temperature begins to fall. The discharge is first sanguineous and then serosanguineous, and in forty-eight hours, if it has not subsided, it is purulent.

There are usually some rise and fall of the temperature and some tenderness over the mastoid for the first few days. After myringotomy these symptoms may subside, only to reappear after several days. In other cases they are continuous until the mastoid is drained. There is active leukocytosis. Early x-ray examination shows a change in the mucosa of the mastoid antrum and cells. After several days a change in the fundus of the canal takes place.

The second form comes on later during the course of the disease, in scarlet fever from the second to the sixth week. It is the result of an infection in the paranasal sinuses, and the discharge has gained access to the tympanic cavity through the auditory tube. The invasion may be accompanied by a rise in temperature and some pain, or it may develop so insidiously that the first sign is discharge on the pillow.

The infection which produces this type is usually of less virulence, and the mastoid antrum and cells are involved without pronounced symptoms, usually until they are more or less completely broken down. Swelling behind the ear may be the first symptom to suggest a surgical mastoid. Frequent inspection of the canal and drug will reveal a gradual increase in the sagging of the posterior-superior canal wall and obliteration of the angle between the drum and the canal wall, or there may be a nipple-like projection of the drum which invites incision but on incision shows only a swollen, edematous membrane.

Early free linear incision of the tympanic membrane is advocated. It relieves pain and is usually followed by a fall of temperature. Repeated incisions are seldom of value. The tympanic membrane which invites them is usually bulging in the posterior half, and the bulging is caused by a swollen edematous mucosa of the middle ear brought about by a low grade infection in the mastoid. On the other hand, incision of the membrane after rupture when the drainage is not sufficient is of distinct value.

When looking for original research material on otitis media one naturally turns to the hospital records of patients with scarlet fever and measles, and, as the otitis of scarlet fever and measles is reasonably representative of otitis in general, it may be of interest to consider a few statistics concerning this type.

A search was made of the records of 14,733 patients with scarlet fever for data on acute suppurative otitis media, and it was found that 1,535 of them had had the condition and the number of ears involved was 2,186. Of these, 858 ears received myringotomy before the drum ruptured, and in 6.6 per cent of them surgical mastoiditis developed; 233 ears were incised after the tympanic membrane had ruptured, and in 7.7 per cent of them surgical mastoiditis developed; 1,095 ears ruptured without incision, and in 9.3 per cent of them surgical mastoiditis developed.[1]

A similar study was made of 1,954 patients with measles. Of these, 427 patients had 651 suppurative ears. In 321 ears, myringotomy was performed before the drug ruptured, and surgical mastoiditis developed in 4.4 per cent. In thirty-six ears the drum was incised after it ruptured, and surgical mastoiditis developed in one. In 294 ears the drum ruptured and was not incised, and surgical mastoiditis developed in 11 per cent.[2]

From these figures the conclusion may be drawn that early myringotomy has a distinct tendency to prevent the development of surgical mastoiditis from otitis associated with scarlet fever and measles.

Those patients in whom otitis media develops early during an infection have frequently a tympanic membrane which requires incision when the patient is first seen by an otologist. When the condition has not reached this stage, attention should be directed toward reducing the inflammation in the eustachian tube, middle ear and nasopharynx.

In young children who are unable to clear the mucopus from the nose and nasopharynx, a small rubber catheter may be inserted into the nostril, with a syringe or other form of mild suction attached, for the removal of the secretions from the floor of the nose and nasopharynx.

The external auditory canal should be kept free of discharge to facilitate drainage.

At the present time sulfanilamide and sulfapyridine are used widely in the treatment of otitis media. The best results are obtained when Streptococcus haemolyticus or the pneumococcus is present.

A series of patients with acute suppurative otitis media and an equal number of controls were treated with sulfanilamide at the Philadelphia Hospital for Contagious Diseases. At the time this paper was written the histories of nineteen patients treated with sulfanilamide and twenty controls had reached the office and the patients had been discharged from the hospital. It was found that 17.1 days was the average duration of the otorrhea for those treated with sulfanilamide and 15.1 days for the controls. One patient was operated on for mastoiditis among those receiving sulfanilamide and none among the controls. I realize that this is a small number for comparison.

Two things are desired in treating suppurative otitis media, namely a dry ear and good hearing.

The presence of superfluous lymphoid tissue in the nasopharynx is a handicap to continuous good health of the ear.

Large, hypertrophied adenoids definitely predispose the patient to otitis media.

In the group of 1,535 patients with scarlet fever before mentioned in whom suppurative otitis media developed, 3.5 per cent had had their tonsils and adenoids removed before scarlet fever developed.

1. Williams, Horace J.: Otitis Media in Scarlet Fever, Tr. Am. Laryng., Rhin. & Otol. Soc., 1932, pp. 247-256.
2. Williams, Horace J.: Acute Suppurative Otitis Media in Measles, Ann. Otol., Rhin. & Laryng. 44: 956 (Dec.) 1935.

In a study of school children of Rochester, N. Y., Kaiser [3] found that a child with well developed adenoids untreated until the age of 10 years will have an appreciable loss of hearing. His survey showed that the removal of lymphoid tissue offers considerable protection against infection of the ear during the susceptible age.

Crowe and Baylor [4] have recently reported good results from the use of x-rays and radium in reducing the lymphoid tissue around the eustachian tube in children with impaired hearing.

Hoople and Cave [5] in a series of 292 cases of scarlet fever brought out by x-ray examination the fact that 91 per cent showed sinus involvement, that each patient with purulent otitis media had involvement of the sinuses of that side and that no patient with normal sinuses had an aural complication.

Campbell [6] observed the close association of sinusitis in children with purulent otitis media. He described sinusitis as the most common of all infantile diseases.

The chief factor in sinusitis producing otitis media is the accumulation of the nasal secretions in the nose and the nasopharynx. The acts of crying and vomiting force the secretions into the eustachian tube.

The administration of drops of various kinds has little effect, as they cannot reach the mucosa because of the abundant secretion covering it. This should be removed and its removal repeated as often as the secretion accumulates. Since infections in the sinuses are responsible for so large a proportion of suppurative otitis media, it is reasonable to suppose that it more frequently produces a less severe inflammatory reaction in the mucosa of the eustachian tube and tympanic cavity, which results in a thickening of the mucosa and obstruction. It is this type of inflammation which is the forerunner of impairment of hearing.

Ciocco [7] reexamined 552 children who had been tested five years previously. His observations indicate that 25 per cent of the patients who presented slight impairment of hearing on the first examination showed on subsequent examination a greater impairment of the same type, that is, either loss for high tones or loss for the tones of the speech range. When there was marked impairment for either of these it did not often improve.

Deafness which develops as the result of adenoid tissue in close relation to the orifice of the eustachian tube or of a sinus infection keeping the mucosa of the eustachian tube and tympanic cavity inflamed is usually progressive. If the cause is not removed and the pathologic process continues for a long period, treatment is usually of little use.

CONCLUSIONS

1. The anatomy of the infant's ear predisposes to otitis media.
2. Sinusitis is a large factor in the production of otitis media.
3. Early myringotomy is a distinct advantage.
4. Impairment of hearing should be recognized and treated early.

5908 Greene Street.

3. Kaiser, A. D.: Children's Tonsils In and Out, Philadelphia, J. B. Lippincott Company, 1932, p. 112.
4. Crowe, S. J., and Baylor, J. W.: The Prevention of Deafness, J. A. M. A. **112:** 585 (Feb. 18) 1939.
5. Hoople, G. D., and Cave, L. S.: Otorhinologic Aspects of Scarlet Fever with Particular Reference to the Sinuses, J. A. M. A. **101:** 1121 (Oct. 7) 1933.
6. Campbell, E. H.: Association of Acute Sinusitis and Acute Otitis Media in Infants and Children, Arch. Otolaryng. **16:** 829-845 (Dec.) 1932.
7. Ciocco, Antonio: Audiometric Studies on School Children, Ann. Otol., Rhin. & Laryng. **47:** 926 (Dec.) 1938.

ABSTRACT OF DISCUSSION

DR. DEAN M. LIERLE, Iowa City: Except for small deposits in the floor and niches, there is normally complete regression of the embryonic connective tissue in the tympanum and antrum of the infant at birth. According to Wittmaach and others, retardation of regression of this embryonic tissue may occur before birth, possibly because of mechanical irritation of foreign bodies, such as vernix or meconium, carried into the middle ear spaces with amniotic fluid. The degree is variable. In some cases there is complete lack of regression. In fact, it is impossible to say just how many tympanic cavities and antrums develop normally. Certainly there are too many which are pathologic. These, as Dr. Williams has shown, may be responsible for infection and delayed healing. On some occasions when I have done myringotomies, the drum when incised has felt like spongy tissue, only a small amount of purulent material escaping. Occasionally the tympanum may be dry but the antrum infected in children with so-called cholera infantum syndrome, particularly if the infection has been present for some time. These late cases require immediate antrotomy, following preliminary treatment to combat the marked dehyration accompanying the infection. Fortunately, most infants and young children respond to conservative methods of treatment, as has been suggested by Dr. Williams. The use of Haskins's suction is at times very valuable, provided care is taken to avoid trauma. Sulfanilamide has proved of great value. However, I am sure that at times myringotomies have been delayed too long when the drug is used.

DR. BORDEN S. VEEDER, St. Louis: It is difficult for me to associate sinusitis and otitis media as cause and effect. It is probably true that in a large number of cases of otitis media there is some involvement of the sinus, but I think that the two conditions are due to the same cause, that is a nose and throat infection, and the sinus becomes involved at the same time that there is an otitis media. I must question the evidence of x-ray plates that have a shadow as showing dependent relationship between otitis media and sinus infection. Pehaps even more important is the question of an early paracentesis. While Dr. Williams referred in his work chiefly to the scarlet fever group, in his conclusions he definitely stated that in otitis media an early incision of the drum is of advantage. I should not want to have a statement of that kind go out from the section without some one disagreeing with him. Certainly as far as young children and infants are concerned an early incision is often of decided disadvantage. The pediatricians see a tremendous number of patients with otitis media not referred to the otolaryngologists because they take care of themselves. I checked up my records rather roughly over this last winter and about 80 per cent of the cases of otitis media cleared up without any incision. An important study of otitis media has been that of Dr. Bakwin and the staff of the Pediatric Department of Bellevue Hospital. They feel that too many examinations, carelessness in examination and too early incision lead to purulent otitis media. By not allowing any one with a respiratory infection to make an otoscopic examination, by careful technic and by infrequent examinations they have strikingly reduced the incidence of otitis media in the wards of Bellevue Hospital. In the three year period 1931 to 1933 the incidence of otitis media in all infants admitted was 23.3 per cent. During the period when these regulations were in effect, from 1934 to 1938, only 8.9 per cent developed. A great deal could be done in hospitals by careful regulations, infrequent examination and the avoidance of respiratory infection. So far as sulfanilamide and sulfapyridine are concerned, I think we must keep our fingers crossed. Not only have I seen a number of pediatricians and otologists giving a few grains to patients with upper respiratory infections which could not have any effect whatever, but there certainly is a masking of symptoms at times. It will take several years of careful work before we can judge of the value of sulfanilamide therapy in otitis media.

DR. CHARLES HENDEE SMITH, New York: The otologic fraction of this audience will shudder when I say it is impossible to examine the small baby's ear properly with a head

mirror and speculum. One cannot see a baby's ear drum with a speculum and a head mirror as well as one can with a good otoscope. It is impossible to hold a small baby upright and look at the ear. I have the baby laid flat on the bed. The mother spreads his arms. I take his thighs between my knees and then the baby is helpless. In the Children's Service of Bellevue we have a definite set of rules. The child who comes in with a red eardrum is treated for twenty-four hours with epinephrine or ephedrine in the nose instilled once an hour. Between treatments the affected ear is kept uppermost. If the short process is not visible in twenty-four hours, a myringotomy is done. In exceptional cases this period is reduced to twelve hours. Fever is no guide, because the fever comes from the infection which causes the otitis as often as it does from the otitis. The second indication is spontoneous rupture. The man who lets a drum burst and run is riding for a fall. The rupture is small and high up, the drainage is poor and those are the cases in which I see the most trouble, mastoiditis petrositis and impaired hearing later. Pain is no guide; it is over in from four to eight hours. Incision is sometimes necessary. If one thinks of the diameter of a baby's drum, a few millimeters across, and realizes the length of the incision, it is obvious that it may heal partially just as any wound does, even though it is discharging. We allow one reincision, usually not before eight to ten days. Our indications for mastoid operation are persistent or recurring fever, a discharge which becomes more profuse after the fourth or fifth day, and what I call the mastoid test. I am sure that too many drums were incised. I am sure also that in those years there were worse respiratory infections than there were in succeeding ones. Our experience with sulfanilamide has been that of Dr. Williams. We have not been able to abort otitis media with sulfanilamide or sulfapyridine. We are seeing in New York a great deal of harm done by the treatment of otitis media with these drugs. Cases are allowed to go on which need paracentesis or a mastoid operation, and a deep complication develops in some of these.

DR. CLIFFORD SWEET, Oakland, Calif.: I believe that head mirrors are better than any otoscope that was ever made, if they are properly used, and if any one is going to do a good myringotomy he can't do it through an otoscope. The method of holding a child as outlined by Dr. Smith has its dangers. I have one that is perfectly safe, even though the child should urinate. I have the child lie down on the bed and his mother sit on the bed beside him, and if he is the kind that is going to use his legs she need only put her arms across his legs just above his knees and then take one of his hands in each of hers and put them behind the midline of his body. At first if the mother does not hold the child's hands but holds him by the elbows his hands will come up and hit you. If the child resists when you attempt to turn his head to one side, bring his head suddenly forward into full flexion, and you can then turn his head easily to either side. The power of resistance to lateral rotation of the head is reduced to a minimum with the head in full flexion. Having turned his head in this manner, put the heel of your hand with which you hold the ear speculum on his head so that if he happens to move suddenly your hand takes the impact of his head and you don't cut his ear canal or damage it with the ear speculum. It is also important to remove wax from a child's ear canal gently without producing trauma. I learned from Dr. Roy Nelson of Oakland something which has been useful as an indication of whether or not one should do a paracentesis. If the child is old enough to understand and you have gotten his cooperation, you can tell a great deal about the state of his middle ear by determining his ability to hear. I don't care what the drum looks like; if a child can hear up to 50 per cent or more by comparison with his opposite uninvolved ear or with my own by means of the tick of my watch, I let his ear alone and come back the next day and usually find it all right. It is often difficult to differentiate between an otitis media and a myringitis. A myringitis is usually far more painful than otitis media. If the child's hearing is unimpaired or almost so, he hasn't a middle ear that needs surgical relief but has myringitis that should be left alone to take care of itself.

DR. E. LEE MYERS, St. Louis: No one can be dogmatic on the question of ears. Those who have had considerable experience in whether or not a young child should be operated on oftentimes are humiliated, especially when we have a pediatrician in consultation. Many a time I have seen a case and called up the pediatrician and said to him "I can't see any indications to operate here," to ascertain later that the ear drum had burst within a short time. There have been occations when I have wanted to operate and the pediatrician refused to permit me to operate, and I found that he was right. When you are confronted with some of these children that can't breathe with their mouths when their noses are stopped up, you must do something. For a number of years I have used a 0.25 per cent solution of neosynephrin, preferably in isotonic solution. For my presbyopic patients I am using an otoscope and have no trouble in using it, although heretofore I was using a head mirror; hence one has to settle that question oneself.

DR. HORACE JAMES WILLIAMS, Philadelphia: When I mentioned sinusitis in relation to otitis media I was referring particularly to that which occurs in scarlet fever. In scarlet fever, otitis media may develop at any time of the disease from the first day to the last day of convalescence. When it develops early it is usually due to the scarlatinal infection but when it occurs later the sinus infection is responsible for it. In these late cases the otitic symptoms are not marked and a surgical mastoid often develops with extensive destruction of the mastoid process with but few symptoms. About myringotomy I am not radical when it comes to opening an ear. A prominent otologist told me that once he went to see a patient with a severe otitis media and told the mother that the ear had to be opened but the grandmother said "Not in my time have we ever had an ear opened." The next day when he returned the inflammation had subsided and there was no necessity for opening it. On many other occasions when he was on the verge of opening an ear and let it go, the ear had ruptured when he returned the following day. It is difficult to be sure when an inflammation is going to subside or when it is going to rupture. I am associated with a hospital where there is promiscuous opening of ears. A patient entering the receiving ward usually has a paracentesis if no reason can be found for the elevated temperature other than a pink tympanic membrane. Having escaped the intern in the receiving ward, the patient now encounters the intern on service in the children's ward, who opens one or both ears on the slightest provocation and reincises them if there is any evidence of inflammation and an unaccountable elevation of temperature. Should the patient be so fortunate as to escape and continues to have a low-grade fever from an unknown cause, he now encounters the pediatrician, who recommends opening of the drum. If the ears are not infected by the first incision they are subsequently, and they frequently proceed to a surgical condition. The question of opening the ear requires thought and a great deal of experience, and after one has had considerable experience one is going to let some ears go that ought to be opened, and he is still going to open some that would have gotten well without an incision.

A Barrier to Progress.—Research is widely exploited for professional ends; records of imperfect and actually unsound work find an almost open path to the printing press; reports of purely repetitive work have reached an extraordinary and most undesirable magnitude; many papers are republished almost in duplicate. The effect of such publication has passed beyond the bounds of menace; it has grown to form a distinct barrier to progress, with which more serious workers recognize they have to contend. The baneful effects are twofold. By its mass it conceals work that has value; by its quality it undermines the general standard of accuracy in observation and thought. Current teaching in the wards and textbooks, current methods of thought in practical daily work, are built in very large part on the basis of published articles, past and present. The quality of such articles is a matter of vital concern to professional work, both directly and also indirectly, through its influence on progress.—Lewis, Sir Thomas: Research in Medicine and Other Addresses, London, H. K. Lewis & Co., Ltd., 1939.

ABNORMALITIES OF THE EYE AND THEIR SIGNIFICANCE IN TRAFFIC COURT CASES

LOWELL S. SELLING, M.D., PH.D.
DETROIT

Although the Psychopathic Clinic of the Recorder's Court has been examining traffic offenders for fifteen years, the first clinic specially devised for the purpose of giving examinations in traffic cases was created in October 1936, when a special division of the recorder's court clinic was set up in connection with the traffic and ordinance division of that court. Because of the lack of definite information about what constituted a safe driver, it has been necessary for the traffic clinic to feel its way along and to abide by so-called standards until the present, when this paper raises some questions of whether the accepted standards are fair either to the driver being examined or to the public.

Soon after the creation of the traffic clinic I pointed out in a paper [1] that there were three ways in which the physician could be of value in assisting the authorities who are anxious to cut down mortality and morbidity due to traffic accidents. These were by detecting and correcting physical disorders, mental disorders (mild and severe) and disorders of vision. Because of my personal interest in the psychology of vision as well as my interest in neuro-ophthalmology, I found it necessary very early in the career of the clinic to investigate the various appliances which could be

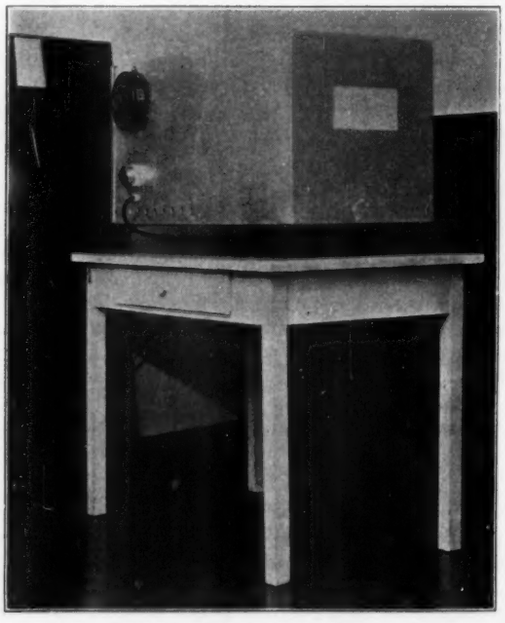

Fig. 1.—The glarometer.

obtained and the standards which were presumed to be of importance in determining which drivers were possessed of safe vision and which were possessed of questionable or dangerously poor vision. It is a sine qua non that a person must see to operate a motor car. How well he should see has been set up by the Committee on Standards of the Section on Ophthalmology of the American Medical Association.[2]

There are four aspects of vision which must be considered: (1) the psychologic aspect, which includes the synthesis of visual sensation into perception and its modification by other psychologic functions such as impaired judgment, bad attitude and mental disease; (2) disorders of the refracting media of the eye and disorders of the extrinsic or intrinsic musculature; (3) organic disorders of retinal function, and (4) the physical aspect. I am unable in this report because of limited time to take up the first two and the fourth considerations, which are of great importance, so I will limit this presentation to a brief summary of our observations with regard to the retina.

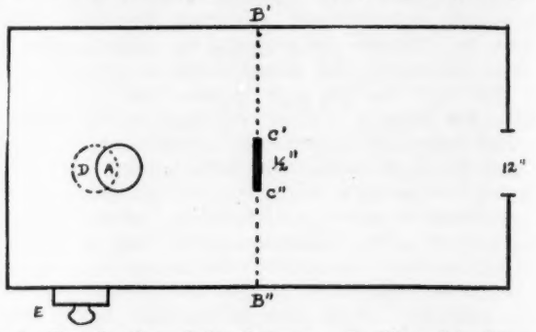

Fig. 2.—Top elevation of the glarometer. In this and in figure 3 *A* indicates 300 watt lamp; *B'B"*, ground glass screen; *C'C"*, printed word; *D*, 100 watt lamp; *E*, rheostat.

METHODS USED BY THE CLINIC

In addition to the usual general physical, neurologic and ophthalmologic examinations, we include tests using special apparatus to determine depth perception, visual fatigue, judgment of speed and distance and other psychophysical tests in which vision plays an important part. Also tests are used by us to determine visual acuity, muscular balance and, what is most important in the present paper, a series of tests dealing with color vision, visual span or horizontal campimetry and glare sensitivity. Of course, an ophthalmoscopic examination is carried out in each case.

The present report deals with 716 persons who were given complete clinical examinations, forty-five control subjects secured from the public at large, who were not given psychiatric examinations, and a similar control group of minor violators consisting of 141 persons who were given the examination by choice instead of spending one day in jail for their traffic violations.

GLARE SENSITIVITY

One of the important physiologic problems confronting the ophthalmologist is the problem of photopic and scotopic vision. The capacity of the eye to function at night is one of extreme importance in the problem of traffic as distinguished from the usual problems which confront the ophthalmologist.

The patient is brought to the ophthalmologist under ordinary conditions because he is uncomfortable, has headaches or has trouble in seeing objects under artificial or natural illumination. The report of the National Safety Council for 1937 [3] reveals that between the hours of 6 p. m. and 6 a. m. 67.2 per cent, or two thirds, of the accidents occur. The reports of Jeghers [4]

Publication of the Psychopathic Clinic of the Recorder's Court, Detroit, Series, T-15.
Read before the Section on Ophthalmology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 19, 1939.

1. Selling, L. S.: The Physician and the Traffic Problem, J. A. M. A. **108**: 93-95 (Jan. 9) 1937; The Psychological Approach to the Traffic Problem, Sc. Monthly **44**: 547-554 (June) 1937.

2. Visual Standards for Operating Motor Vehicles, current comment, J. A. M. A. **111**: 716 (Aug. 20) 1938.

3. National Safety Council: Accident Facts, Chicago, The National Safety Council, Inc., 1936.

4. Jeghers, Harold: The Degree and Prevalence of Vitamin A Deficiency in Adults, J. A. M. A. **109**: 756-762 (Sept. 4) 1937.

and others would indicate that accidents may be due to vitamin A deficiency. Assuming that vitamin A deficiency does interfere with visual function and that rhodopsin is the critical substance in night vision, our glare-test statistics do not indicate that the vitamin A affect on glare vision can be demonstrated.

In a study of forty control cases we were unable to find that there was any marked distinction between the recoverability of a fatigued eye and the unfatigued eye in traffic violators and the control group. Sensitivity to glare was tested by a special apparatus consisting of a box divided in half by a screen of ground glass. The patient's eyes were 18 inches from the ground glass and he looked directly at it. In the half of the box behind the glass is contained a 300 watt lamp, which is adjusted to the place where the luminosity of the whole 24 inch square of glass is approximately equal (fig. 1). The patient is required to look at the ground glass screen on which a word in letters three-tenths inch high is placed. This represents approximately 20/60 vision, thus eliminating error due to reasonable lack of visual acuity. When the patient first looks in this apparatus he is subjected to an intensity of approximately 350 foot candles of light, which is cut down in ten equipotent one second intervals to complete darkness. He reads the word when he can. The range of

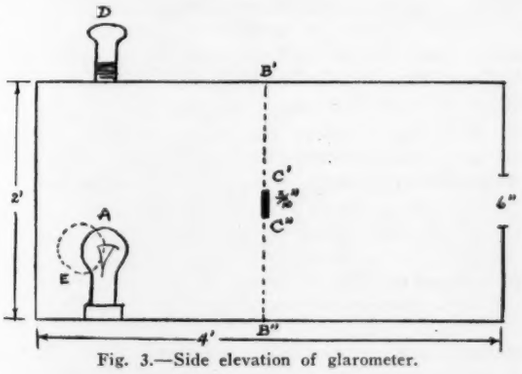

Fig. 3.—Side elevation of glarometer.

the clinic cases extends from immediate perception of the word to inability to read it with light cut to a minimum, probably about 10 foot candles.

Tables 1 and 2 give the age distribution and the racial distribution in ten intervals for sixty-one subjects. It has been assumed that age is important, but the results shown in these tables do not convince me that the belief of Allgaier [5] in this respect—that the glare sensitivity increases with age—is correct. In a comparison between white persons and Negroes, one can see that Negroes are much less sensitive to glare than the white person.

We divided our subjects into those with adequate and those with inadequate diets and we found that the average sensitivity to glare in the two groups was almost identical, the average being approximately 70 units. This would imply that the lack of butter and rich foods in the diet which might supply vitamin A is perhaps not necessarily responsible for collisions at night and that vitamin A research may be less important in the problem of night blindness than was thought. Because of the different results in Negroes and white persons, the amount of pigmentation in the retina is very likely of more importance.

5. Allgaier, Earl: Age and Driving Efficiency, reported at the Annual Meeting of the American Association of Applied Psychologists, Columbus, Ohio, Sept. 6, 1938.

FIELD OF VISION

One of the points which seems to interest the psychologist the most is the problem of the field of vision. One of the arguments presented by Lauer [6] and De Silva [7] is that the field of vision should be examined in order to determine whether a man is safe on the highway. They warned the public that there are many men who commit serious traffic violations who have

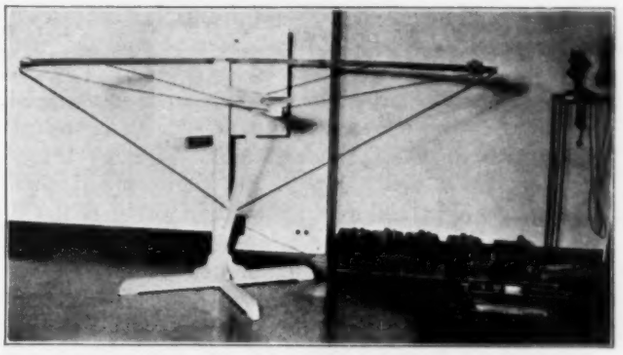

Fig. 4.—Traffic horizontal campimeter.

tunnel or gun-barrel vision. In the whole group of 716 persons passing through our clinic who were referred because of accidents, traffic violations, such as going through red lights and other forms of misconduct which might be due to the fact that they could not see properly out of the corners of their eyes, only five persons had less than 140 degree angles of vision for movement and all had corresponding visual fields for colors. In all five of these pathologic cases, with the exception of one special case in which the subject was sent in because he had been hit from the side three times (he was not brought into court; his examination was requested by his employer), definite neurologic disease was found. There were two with multiple

TABLE 1.—*Average Glarometer Readings: Distribution According to Race in Sixty-One Control Cases Seen in the Traffic Division of the Psychopathic Clinic of Recorder's Court, Detroit, 1939*

Glarometer Readings	White		Negro		Total Cases
	Number	Percentage	Number	Percentage	
100-91	17	35.41	9	69.23	26
90-81	4	8.33	1	7.69	5
80-71	5	10.41	0	0.00	5
70-61	3	6.25	0	0.00	3
60-51	0	0.00	0	0.00	0
50-41	2	4.16	1	7.69	3
40-31	1	2.08	0	0.00	1
30-21	0	0.00	0	0.00	0
20-11	0	0.00	0	0.00	0
10- 0	16	33.33	2	15.38	18
Total	48	100	13	100	61

sclerosis, two with dementia paralytica and in one case a brain tumor was suspected. Complete perimetry verified the defects of the visual field. There were no cases in which scotoma was noted, nor have we yet

6. Lauer, A. R.: The Eyes Behind the Windshield, Nat. Safety News **34**: 34-35, 1932; A Portable Research Clinic and Its Value, Am. J. Optometry **12**: 85-90, 1935. Lauer, A. R.; Ellis, C. R., and Hare, R. R.: The Prevalence of Visual Defects and Their Relation to Automobile Driving, J. Am. Optometric Assn. **7**: 1-7, 1932. Lauer, A. R., and Kotvis, H. L.: Automotive Manipulation in Relation to Vision, J. Applied Psychol. **18**: 422-431, 1934.

7. De Silva, H. R.: On An Investigation of Driving Skill, Human Factor **10**: 1-13, 50-63, 1936; Driver Testing Results, Harvard Traffic Bureau WPA Project No. 6246-12259 Military Department, Commonwealth of Massachusetts, Boston, 1937.

found the characteristic hysterical tunnel vision of the psychoneurotic.

Table 3 shows the average readings for the various colors in our two control groups, forty-five members of the general public, and 140 minor offenders. These results are expressed in inches, 57 inches being the distance from the target of the perimeter to the end of the rail carrying a small car (fig. 4).

Our special perimeter consists of a semicircular rail which is 1 meter equidistant from the chin rest, the target being directly in front, as it should be, and the rail extending 90 degrees to each side. The reason we use such a large perimeter is to eliminate defects in lighting and perhaps minor defects in the refracting media of the eye. Since illumination may bring the various color fields out to the periphery if there is too much light and restrict them if there is too little, it is possible, by having a large overhead light giving 60 watts of illumination at all points of the circle, to eliminate this error. We also give a realistic effect by having small cars on the track which the subjects describe as soon as they can see the color, shape or movement. These can be changed without the subject's awareness of the change and provide a more accurate detection of the actual field than could be gained with the usual small perimeter, because the clinic perimeter eliminates psychologic errors due to cheating and overanxiety.

TABLE 2.—*Average Glarometer Readings: Distribution According to Age in Sixty-One Control Cases Seen in the Traffic Division of the Psychopathic Clinic of the Recorder's Court, Detroit, 1939*

Glarometer Readings	15 to 19 Years	Percentage	20 to 24 Years	Percentage	25 to 29 Years	Percentage	30 to 39 Years	Percentage	40 to 50 Years	Percentage	50 to 60 Years	Percentage	Total Readings	Total, Percentage
100	7	11.48	5	8.20	6	9.84	8	13.11	..	.....	..	..	26	42.62
90-81	1	1.64	3	4.92	1	1.64	..	.....	..	.....	..	..	5	8.20
80-71	3	4.92	2	3.28	..	.....	..	.....	..	.....	..	..	5	8.20
70-61	1	1.64	..	.....	2	3.28	..	.....	..	.....	..	..	3	4.92
60-51	..	.....	..	.....	..	.....	..	.....	..	.....	..	..	..	.....
50-41	..	.....	1	1.64	1	1.64	1	1.64	..	.....	..	..	3	4.92
40-31	..	.....	1	1.64	..	.....	..	.....	..	.....	..	..	1	1.64
30-21	..	.....	..	.....	..	.....	..	.....	..	.....	..	..	..	.....
20-11	..	.....	..	.....	..	.....	..	.....	..	.....	..	..	..	.....
10- 0	2	3.28	5	8.20	1	1.64	5	8.20	5	8.20	..	..	18	29.50
Total taken..	14	22.95	17	27.87	11	18.03	14	22.95	5	8.20	..	..	61	100

TABLE 3.—*Average Perimetric Readings in 185 Control Cases Seen in the Traffic Division of the Psychopathic Clinic of Recorder's Court, 1939: Average in Inches*

Age	Blue Car Readings		Red Car Readings		Green Car Readings		Movements Readings	
	Left	Right	Left	Right	Left	Right	Left	Right
15-19	16	34	15	15	16	35	51	51
20-24	30	24	22	23	18	19	50	52
25-29	21	18	23	25	17	20	49	49
30-34	18	26	22	26	15	21	50	51
35-39	20	27	22	26	20	24	50	52
40-44	24	21	25	16	20	23	50	42
45-50	18	23	22	50	21	18	48	51

COLOR VISION

Last, but not least, a few words are needed about our observations in regard to color vision. It will be noted from table 3 that the color fields are substantially those which usually are found: the field for movement is greatest, that for blue next, that for red lowest and that for green between blue and red.

We were very much interested to find in our studies that of 716 subjects there were ten, or 1.3 per cent, who were partially red-green blind. There were thirty-nine, or 5 per cent, who were red-green blind and one who was totally color blind. These were the results of the Ishihara test and the patients were checked on a traffic semaphore with adjustable lenses so that position error could be eliminated. All but three of the color blind could distinguish a red from a green light with ease. None of the color blind had serious traffic records. Only twelve had a record of going through a red light, while a much greater number of the "normal" had tickets for this offense. The three who could not make the distinction between the lights were found to be suffering in two cases from a severe degree of feeblemindedness and in the third case from dementia paralytica. During presentation of clinic material to groups of drivers it was possible to find and check a number of color blind persons in the community, and reports are at hand of three drivers who have been given awards for safe driving during the past two years who are definitely red-green color blind and who have never had a ticket and have in several hundred thousand miles of driving not had an accident. The clinic is inclined to minimize the problem of color blindness and is doubtful whether it is important in driving a car safely. Certainly a color blind person can use clues as the position of the lights and the movement of other cars. Several color blind drivers have told us that they are able to make a distinction between traffic lights but cannot match colors in clothing, and their safe records bear out the idea that color blindness per se does not make a driver dangerous.

CONCLUSION

It can be said that the determination of the adequacy of retinal function is very important in deciding whether a man should drive a car. The matter of glare sensitivity remains up in the air, but apparently those with more pigmented retinas are less sensitive and diet may be less important than is now thought. Visual fields are seldom impaired, and color blindness does not necessarily interfere with a person's ability to drive a motor car.

I hope on some future occasion to be able to discuss our observations with regard to acuity and other visual functions and perhaps to enlarge on the retinal factors to a greater extent as our information is exemplified, but it is my belief that I have here indicated the need for clear thinking as regards the application of what is known about retinal function to the problem of the motor car operator.

330 Recorder's Court.

ABSTRACT OF DISCUSSION

DR. ARTHUR J. BEDELL, Albany, N. Y.: Organic disorders of retinal function, color vision, "visual span" and glare sensitivity are important phases of the ocular examination of automobile drivers. Dr. Selling confirmed my impression that vitamin A deficiency has no demonstrable effect on vision in the dark. Although his clinical apparatus does not simulate actual working or road driving conditions, his report is worthy of serious consideration; but, before enduring conclusions can be reached, it seems advisable to have as controls a much larger number of automobile drivers from several different localities. The author's observations on color defects are interesting and well substantiated by ophthalmologic experience. The intensity of light is frequently the guide by which a color blind auto operator distinguishes between the stop and go signals. I made contact with the New York State Bureau of Motor Vehicles to determine some of the ocular reasons for automobile accidents. I was permitted to check the reports which are being tabulated in the department at Albany. Eventually the segregated material will be of great assistance to those engaged in analyzing accidents as well as those working to prevent them. Perhaps the most important observation made from the New York State records is that drivers with markedly defective vision in one eye had an accident on the side with the better vision in 50 per cent of the cases. But here again the cross section of operators and accidents is too small even to predicate a suggestion of a statistical formula. The observations have a distinct bearing on the author's perimetric studies and conclusions and may lead to the intimation that the mental condition of the driver is one of the essential factors in safety. The work this section has done in outlining the visual requirements has met with widespread approval and the standards have been adopted by several states.

DR. ALBERT C. SNELL, Rochester, N. Y.: Dr. Selling has limited his discussion to retinal functions, especially to glare sensitivity. He states that the "solution is still up in the air." This statement is true for several reasons: 1. The term glare has not been precisely defined. 2. There is uncertainty as to the exact elements of the function of vision which are being tested by the glarometer. 3. There is no standard for glare sensitivity by which to determine the normal or efficient operator and the inefficient or dangerous operator. Glare might be defined as a disturbance of visual sensation caused by excessive aberrant rays of light. I am at a loss to know what physiologic function of vision is being measured or tested in the use of the so-called glarometer. We probably have here a test of the power of adaptation. But, since the test object is placed at the center of fixation and also of illumination, this test seems to be one of speed of recovery from retinal shock, fatigue or exhaustion for variable decreasing light intensities. The test is probably not that of adaptation of the macula, as this sense is absent here according to the belief of physiologists. The physiologists make a distinction between adaptation and fatigue. I wish that Dr. Selling could make clear the relation between adaptation, fatigue and glare. Evidently there is some relation between the adapted eye, contrast, the intensity of illumination, the length of exposure for various intensities, and the time period necessary for recovery of a normal visual function. It would be helpful if scientific workers could establish some definite formula by which all these factors would give a quantitative measurement by means of which glare sensitivity might be made practical for the determination of the individual's capacity or efficiency to operating a motor vehicle. Dr. Selling speaks of an "adequate function" but this is not defined. The test objects looked at in Dr. Selling's tests require an approximate visual acuity of 20/60. This low acuity destroys to some extent the value of the test, since visual acuity is acknowledged as an important factor in the individual's tolerance to glare. Glare tests should be made by means of a test character which corresponds to the individual's best acuity while wearing the proper correcting lenses. The complexity of the problem is obvious and still unsolved. For this reason the subject of glare was omitted from the report of the Committee on Visual Standards for Operators of Motor Vehicles which was submitted to this section last year. This committee found no standard for normal, no satisfactory instrument by which to measure glare sensitivity or its recovery, and no standards for glare sensitivity by which an individual might be classed as a hazard in operating a motor vehicle.

DR. LOWELL S. SELLING, Detroit: I tried to limit my paper to testing the eyes of drivers, and both discussers have opened up rather vast fields which I feel I should not take into consideration at present. With reference to Dr. Bedell's comments I should like to state that we use a special perimeter for many reasons. With the standard perimeter, particularly, there are certain types of cheating, the flick of the eye which the observer occasionally misses. Also we are trying to eliminate the factor of visual acuity because I question the standards of visual acuity for drivers. This perimeter eliminates this factor by its 1 meter depth, to detect gross changes important to drivers rather than fine scotomas. Dr. Snell opens up a wide field. He is correct in raising the question of definition of glare. Our apparatus correlates about 0.62 with night accidents, a fact not presented in the paper because I do not think it is yet substantiated by a sufficient number of cases. This apparatus does simulate what goes on when a car comes at one with very bright lights. The subject reacts and the accident occurs while the retina is recovering, so that here we try to get some sort of measure of retinal recovery. The size of the word is not important; a symbol could be used. Visual acuity errata are eliminated by using a very large object which the light will penetrate at even low intensities and which is easy for the person to see. With regard to visual fields, other factors may be more important than physical condition; i. e., the type of hat worn by some women shuts off the vision of one eye and perhaps limits the other. With regard to glare, the mechanical factor such as the raising of the headlight beam by the weight of people in the back seat of a car may be more significant than physiologic observations.

AMPUTATION STUMPS OF THE LOWER EXTREMITY

PAUL C. COLONNA, M.D.
AND
FREDERICK vom SAAL, M.D.
OKLAHOMA CITY

Our purpose in this paper is to report a study of seventy cases of amputation of the lower extremity. We will present the causes for amputation and the treatment received, as well as the present appearance and function of the amputation stumps.

This entire subject received great emphasis after the World War, at which time it has been estimated that more than one-half million amputations were done. Surgeons began analyzing their cases, and closer contact with the prosthesis makers emphasized many practical phases of the problem. As a result the rather well defined rules for stump lengths have been repeatedly stressed. This study will show that if these rules are violated reamputation frequently becomes necessary.

During the past nine years in the orthopedic service at the State University and Crippled Children's hospitals there have been more than 250 amputations, and for our follow-up study seventy patients returned. The average follow-up period was thirty-one months. Seventy-two per cent of the patients were males, which is probably accounted for by the fact that all the amputations due to trauma were performed on males. The age at amputation ranged between 4 and 76 years, but more than one half of the patients were between the ages of 10 and 20. Severe trauma was the reason for the largest number of operations and accounted for about 25 per cent of the total number; accidents in

From the Crippled Children's Hospital.
Read before the Section on Orthopedic Surgery at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 19, 1939.

which the patient was struck by a train predominated. Congenital deformities, such as absence of the tibia, absence of both bones of the leg or pseudarthrosis accounted for nine amputations, and infectious processes, such as some type of osteomyelitis, including tuberculosis, accounted for twelve. The presence of a

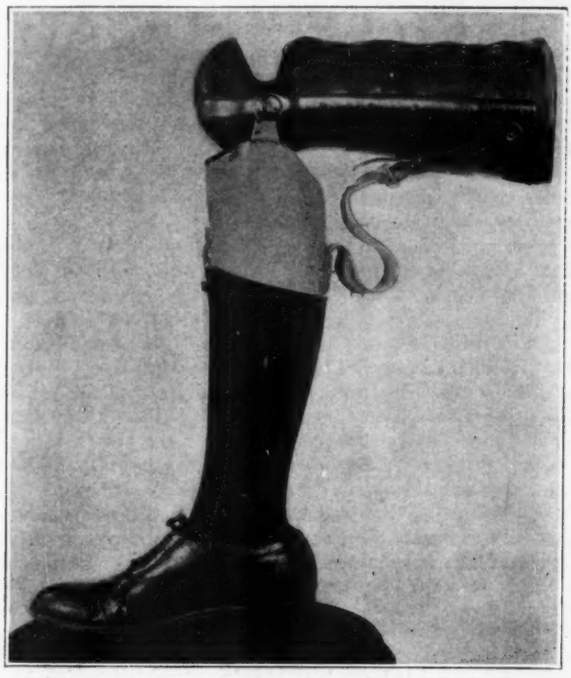

Fig. 1.—Molded leather socket for knee disarticulation.

malignant tumor accounted for sixteen, and vascular occlusion, such as diabetic, arteriosclerotic or postoperative thrombosis, for the remaining thirteen.

Generally speaking, one may say that an amputation may be considered whenever there is a reasonable certainty that an improvement in form or function will follow the operation. As a rule one should be much more loath to amputate in the upper than in the lower extremity, because of the generally unsatisfactory prosthesis for the upper extremity. The finer type of movement required of the non-weight bearing extremity is an obvious difficulty, for, in spite of the excellent contributions of Sauerbruch in Germany, Vanghetti in Italy and Kessler [1] in the United States by the cineplastic prosthesis, the average surgeon will amputate the upper extremity only as a last resort and then is extremely careful to obtain as long a stump as possible.

A severe injury to a limb through trauma may require immediate amputation, but a severe compound fracture is not in itself an indication for amputation. Every attempt should be made in the early treatment following severe injury or infection to save an extremity unless the crushing type of accident, or the type of infection, renders amputation a necessary, life-saving procedure. If severe shock is present the operation must be deferred, and in the interval blood transfusions and intravenous injections of saline solution should be employed.

An ideal stump should be conical and smaller than the opposite extremity. In the leg the amputation should be at the junction of the upper and middle thirds, and the stump thus varies between 4 and 8 inches in length, depending on the height of the patient. In the thigh it should include all available length above the condylar flare. The skin, including the scar, should not be adherent to the bone. The scar may be anterior, posterior or at the end. The end of the bone is preferably covered by soft parts of not more than one-half inch in thickness. The bone should be amputated by the aperiosteal method described by Kirk,[2] and the ends should be rounded. Therefore there will be neither sharp edges nor spurs. In the leg the fibula should be cut 1½ inches higher than the tibia. When the stump is shorter than 5 inches the fibula should be excised. The nerves should have been injected with alcohol.

The closed method of amputation, from which primary union is expected, was used in almost all of our cases, but there were a few guillotine amputations.

As for the operation, probably the most important decision is regarding the choice of amputation site. Beginning at the foot, operation through the metatarsals is permissible. We have a patient with a midmetatarsal amputation who has an excellent result because the insertions of all the important tendons remain and the foot is balanced. The Lisfranc and Chopart amputations, through the tarsometatarsal and mediotarsal articulations respectively, are rather generally condemned, both for the application of an efficient prosthesis and for weight bearing. An equinus foot nearly always results from either of these procedures. In this series there was one Chopart amputation, and the patient had a poor result because no satisfactory prosthesis could be fitted to the stump and because the skin frequently broke down over the end of the stump. Another patient had a transmalleolar amputation; some of the malleolar flare had been left and the tibia measured 14½ inches. This stump remained healed only as long as the patient did not use his prosthesis but always ulcerated after a few days of weight bearing. The ankle appliance was very unsatisfactory, and he was admitted to the hospital

Fig. 2.—Short stump, with a movable painful fibula, which should have been excised.

for reamputation. When he was last seen a 7 inch tibial stump was giving him a satisfactory extremity. A tibial stump that is much shorter than 7 inches may be satisfactory, although it is not preferred. The shortest stump in this series measured 1½ inches from the joint line to the end of the tibia, yet the knee motion was quite good. One girl had bilateral 2½ inch tibial stumps and

1. Kessler, H. H.: Am. J. Surg. **31**: 316 (Feb.) 1936; **43**: 560 (Feb.) 1939.

2. Kirk, N. T., in Lewis, Dean: Practice of Surgery, Hagerstown, Md., W. F. Prior Company, Inc., 1930, vol. 3, chapter 10.

walked very well. However, she illustrated another point; that is, if the stump is shorter than 5 inches we have always found it necessary to excise the fibula. This was not done on either of these stumps originally and a second operation was necessary on each. Most of our knee disarticulations have been unsatisfactory

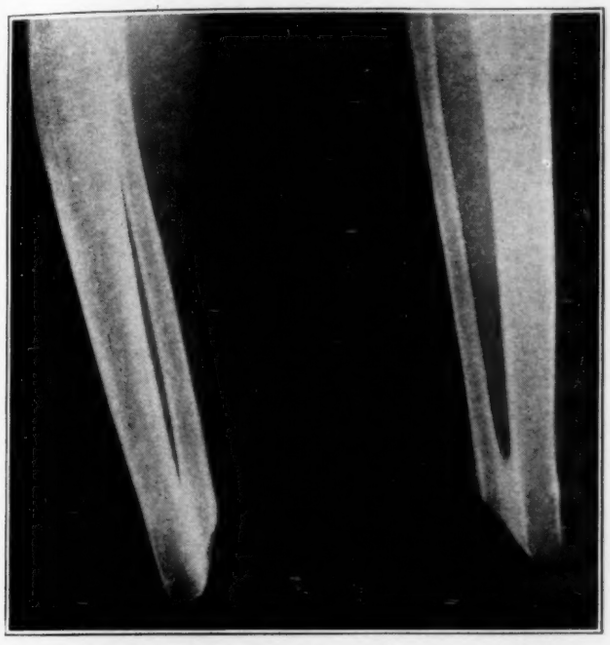

Fig. 3.—Cross union between the tibia and fibula; an excellent stump.

because the wide condylar flare made the application of a prosthesis difficult. However, we believe that the fault does not lie with the type of stump. The prosthesis shown in figure 1 gave one of our patients a very satisfactory extremity. The socket is made of molded leather and is end bearing. The knees are at the same level and the femur does not protrude. The distal end of the femur with cartilage intact is a normal weight bearing surface and to leave it should be preferable to severance of the bone. But the stump is usually fitted with a conical wooden socket which is very unsatisfactory and frequently painful. In our experience the Gritti-Stokes amputation usually gives a painful and unsatisfactory stump. In the thigh it is advisable to preserve as long a stump as possible above the condylar flare. The shortest stump in this series was 4 inches. This is regarded as undesirable but a great deal better than a disarticulation at the hip joint for the wearing of a prosthesis. It was also noted that the longer the stump the more satisfactory the gait of the patient, for the amputation stump could fit more securely within the prosthesis and be a more active lever in walking.

There were in this series sixteen cases in which amputation was done because of a primary malignant tumor of the bone, and it might be mentioned at this time that we are beginning to feel that, when the tumor involves either the humerus or the femur, disarticulation at the proximal joint offers the best opportunity for survival, even though it greatly increases the difficulty of fitting the patient with a prosthesis. So far, more of the patients in our series are alive after disarticulation at the proximal joint than after severance of the affected bone. In several cases, sections of the marrow at the originally selected amputation site yielded tumor cells, so that amputation at a higher level was necessary.

The Callander[3] type of amputation just above the condylar flare has given some of the most satisfactory femoral stumps. Six patients had this type of amputation. They required a good deal of postoperative care to insure even coverage of the stump. In our experience heavy muscle flaps give poor stumps on which to fasten a prosthesis, but we feel that this operation is at present the most desirable one we have for amputations in the neighborhood of the knee joint.

At the operation, gas oxygen and cyclopropane are considered the ideal anesthetics for amputation, although at times spinal anesthesia in the aged patient is particularly satisfactory.

CAUSES FOR REAMPUTATION

While amputation proximal to the metatarsals may occasionally be employed, we feel that it is generally unsatisfactory both for the application of an efficient prosthesis and for weight bearing. Reamputation with a tibial stump of 7 inches would usually be more satisfactory. If for some reason the tibial stump is less than 5 inches, we feel that the result will be much better if the fibula is excised at the time of the original amputation. Six reamputations were done because of a long or painful fibula. Figure 2 shows a pointed fibula the same length as the tibia. It was also freely movable and bothered the patient a good deal, so that excision was necessary. However, cross union between the tibia and fibula may give an excellent stump, as shown in figure 3.

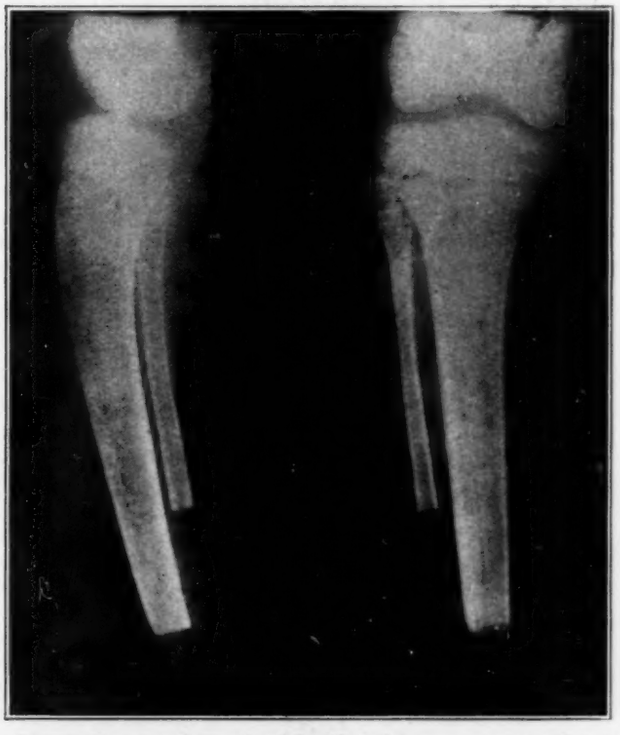

Fig. 4.—Reamputation and epiphysial fusion were necessary because of growth of the bone. Note the open epiphyses.

Five patients were reoperated on for removal of painful spurs, and many more had tender points over spurs which, while not enough to warrant reoperation, were annoying. We therefore feel that great care should be exercised in exposing and retracting the periosteum at the operation. Seventeen patients in this series without alcohol injections of the nerves had no complaints, but

3. Callander, C. L.: A New Amputation in the Lower Third of the Thigh, J. A. M. A. **105**: 1746 (Nov. 30) 1935.

eight others had nerve pain or had reoperation for neuromas. No patient who received an injection of alcohol had nerve pain, and therefore we feel that injection of 95 per cent alcohol is desirable. The use of a tourniquet has been condemned by some authors but was used in practically all the amputations except the six Callander operations, and it is felt that it makes the operation much easier and is desirable.

In cases of vascular occlusion or arteriosclerotic gangrene we have been using histamine flare injections at the ankle, at the midleg and just above and below the knee. An area of erythema less than 1 inch in diameter after five minutes is considered evidence of poor circulation. Of two patients whose stumps failed to heal, one had had no previous histamine flare, and the other had amputation at a level at which the flare measured only one-half inch. Both had to have reamputation at a higher level.

After a leg amputation, splints or plaster should be applied to the knee. There were six cases of persistent knee flexion contracture, which was corrected with considerable difficulty. There were several other cases in which knee flexion contracture held up the application of a prosthesis for some time. In none of these had a splint been used.

Infection of the hair follicles caused considerable annoyance to several of the male patients. When the infection does not respond to the usual measures it is probably best to remove the hair by electrolysis.

One of us (F. vom S.) has recently reported the use of epiphysial fusion in children in whom the upper tibial or lower femoral epiphysis or both were open at the time of amputation. Five patients had to have reamputation because the growth of the bone was not compensated for by an equivalent growth of the soft parts. This resulted in tightly stretched skin and a painful stump, necessitating a reamputation. Figure 4 shows a roentgenogram of a boy whose leg was amputated at the age of 7, a 6 inch stump being left. He walked well until the age of 12, at which time the stump became very painful and measured 9½ inches. The roentgenogram shows the upper tibial and the fibular epiphysis to be wide open. A reamputation left a 7 inch tibial stump, and both epiphyses were fused. In spite of the continued growth of the extremity, the stump has remained the same length. This difficulty has not been

TABLE 1.—*Cause for Amputation*

	No. of Cases	%
Trauma	20	28.6
Congenital condition	9	12.8
Infection	12	17.1
Malignant growth	16	22.8
Vascular disease	13	18.7
	70	100.0

noticed in the case of femoral amputations above the lower epiphysis, probably because very little growth occurs at the upper epiphysis.

There was, therefore, in these seventy cases a rather large percentage of reamputations, 28.6. This series is reported from a state hospital, and many of the cases of traumatic and infectious origin are seen in a rather advanced stage. Many of the patients live a long distance from the hospital and delay returning for examination and detection of early signs and symptoms until their difficulties are well advanced.

In fitting a prosthesis on a patient with a bilateral amputation it is usually better to shorten his height by several inches, because a better leverage can be obtained. We have recently found that patients who have had femoral amputations are better satisfied if the prosthesis has hip control instead of the usual shoulder control. The patient is more comfortable with the former, and his motions are much less awkward. The average time for fitting the patient with a permanent prosthesis was five and one-half months. This rather long interval is due to several causes. Patients with amputation for a malignant growth must have survived one year postoperatively before the Crippled Children's Commission of Oklahoma will furnish a prosthesis. We

TABLE 2.—*Causes for Reamputation in Twenty Cases**

	No. of Cases
Infection	10
Neuromas	4
Spurs	5
Troublesome fibula	5
Tight skin	5
Long stump	3
Recurrence of tumor	1

* Several patients had multiple complaints.

feel also that the patients were slower to return for their permanent prosthesis than in most clinics. Another factor was the delayed wound healing, ten of the stumps requiring from two to six months to heal. An interesting point in this study is that not one of the patients was fitted with a temporary prosthesis, in many instances because of factors over which the surgeon had no control.

Shrinker bandages should be applied to the stump as soon after operation as possible. This is particularly true in cases of high femoral amputation in which the excess amount of fatty and other soft tissues frequently makes the application of a prosthesis very difficult. In these cases the bandage should probably be worn at night even after the artificial limb has been applied.

ABSTRACT OF DISCUSSION

DR. ROBERT G. PACKARD, Denver: The indications for amputation are comparatively few: much fewer than some three decades ago. Many bad compound fractures with loss of bone substance can now often be successfully handled with skeletal traction until healing takes place instead of being at once condemned to amputation. The use of insulin and the interdiction of tobacco have kept untold numbers of patients with diabetic gangrene and with thrombo-angiitis obliterans from the surgeon's knife, and the x-rays have cured many cases of gas bacillus infection. But there are the definite indications: complete severance of the main blood supply, uncontrollable hemorrhage, extensive cancer, deformity with painful weight bearing, persistent nonunion, gangrene of the extremity and overwhelming infection. A definite contraindication to immediate amputation is shock. The site of election is paramount. In the foot one should not amputate above a point distal to the bases of the metatarsal bones because of almost inevitable muscle imbalance causing a bad equinus. Pirogoff's method, by which weight can be borne on the posterior portion of the os calcis, implanted into the under surface of the tibia, or Syme's, in which the whole weight is borne on the sawed end of the tibia, is of distinct advantage to the patient who cannot afford a prosthesis. The lower third of the leg should not be chosen on account of the relatively poor blood supply. The site of election in the leg is 7 inches below the insertion of the hamstrings, with the fibula divided 1 inch higher than the tibia. Here the anterior or anterolateral flap should predominate, the bone end cleared of periosteum three-fourths inch above its tip, rounded over and covered with a muscle flap, and a splint used to combat flexion of the knee. If less stump is necessary, it must be at least 1½ inches long and all of the fibula removed. Disarticulation

at the knee is not recommended. I have been reviewing the closed method of amputation. But sometimes when time is a big factor, infection is overwhelming and much crushing has occurred or immediate transportation is necessary, I resort to the open or guillotine method, which allows full exposure for dressing. There is the flap or the flapless type, the latter the choice. Further surgery is always necessary. Meanwhile skin traction is essential to prevent retraction of soft tissues and to limit spread of infection. Secondary operation must be done after treatment with diluted solution of sodium hypochlorite and is sometimes possible after ten days. In all these cases persistent skin traction is very valuable in preserving as long a stump as possible.

DR. JAMES R. ELLIOTT, Kansas City, Mo.: I had a rather unusual opportunity of observing end results in amputation through thirteen years' connection as consultant orthopedic surgeon in the United States Veterans' Bureau. Those men were receiving disability payments of from 45 to 65 per cent and when they were not able to wear their artificial limbs they received 100 per cent disability, so that there was some inducement for them to be disabled. I observed that the Gritti-Stokes type of amputation lost less time from furuncles of the stump than any other amputation. If a muscle-controlled knee can be preserved satisfactorily it should be by all means, but if that is not possible the Gritti-Stokes type of operation is by far the procedure of choice so far as loss of time of the patient from furuncles on his stump is concerned.

DR. RALPH K. GHORMLEY, Rochester, Minn.: In spite of the advances made in conservative treatment of vascular disease, we still have a real problem in trying to save some of these limbs and also in saving most of the limb if we can when amputation is inevitable. When these people come to amputation they have been through a long period of conservative treatment, they have failed, and they have often lost their morale and their means and everything that goes to make for a good result. The first important thing in considering these cases when both limbs still remain with one gangrenous is to try to get the best possible stump and, of course, that is one below the knee, because almost inevitably sooner or later they will come to amputation of the other leg and probably a little later it will have to be done above the knee. The only way that one can reliably—and that is not too reliably—decide where to amputate is to make an incision below the knee joint without a tourniquet and see what exists in the way of collateral circulation. The main vessels will probably be occluded in most instances. In using that test I have been able in many instances to get a satisfactory stump below the knee, which is a big help and saves much in the way of trouble later on. The authors have described the proper method of treating the bone. I should like to stress the handling of the soft tissue. Everything that one reads on amputations below the knee tells one to use the long anterior flap. Now, in these cases, particularly of Buerger's disease or diabetes, in which one is occasionally able to amputate below the knee, if either flap is going to break down it is the anterior flap. The only satisfactory way is to make a long posterior flap. Make the flap long and from the flap excise most of the muscle tissue. Do not leave a bulky mass of muscle over the end of the bone and hope to have it heal, because that muscle is going to slough; while it may be absorbed, more often it will slough and break down. Peel off practically all the muscle tissue and leave a very thin layer of muscle and fascia to cover the end of the bone. Then fix the flap in place with sutures to the soft tissues along the anterior surface of the bone and close with a drain practically always, because they are almost always infected and potentially serious from that standpoint. I use a prophylactic dose of gas gangrene antitetanic antitoxin because a flare-up of that type of infection may occur in the stump.

DR. J. ALBERT KEY, St. Louis: I am sorry Dr. Evans of Minneapolis is not here, because he has just completed a study of several hundred amputations. His idea was to find what type of amputation stump gave the best results from the standpoint of the ability of the patients to wear their prosthesis and also from the standpoint of their reentering the hospital later for further operation. He concluded that all amputations of the lower extremity should be done at or above the knee; in other words, an end bearing stump through the condyles gives a much more satisfactory result than any amputation through any portion of the leg or the foot if it is necessary to remove the metatarsals. This is something we should be thinking about, because, as we analyze our results, we may come to agree with him. I should like to emphasize that in malignant conditions we should not compromise. We should not attempt to save an inch or two of bone but should disarticulate.

DR. LENOX D. BAKER, Durham, N. C.: There is one amputation, Pirogoff's, that Dr. Packard mentioned, which has not been done extensively in this country. A few years ago Dr. Harris of Toronto reported a series of low amputations with weight bearing stumps at the heel that were very satisfactory. In North Carolina, an agricultural district, the idea of fitting a farm worker with a prosthesis is out of the question; the limbs do not wear well because of the grit and dirt, and as a result I have resorted, when possible, to Pirogoff's amputation with very satisfactory weight bearing limbs. The patients are able to get around the house without putting on a prosthesis and they are able to work as agricultural laborers.

DR. ROBERT D. SCHROCK, Omaha: In the discussion there has been omitted what to me seems a very important feature in the immediate postoperative treatment of these amputation stumps, as a preventive measure to the shortening of the muscular flap, to prevent undue strain on the skin, and that is the use of mole skin adhesive skin traction. It will add to the comfort of the patient. There will be less disturbance of healing and there will be less involvement of the nerve ends.

DR. S. PERRY ROGERS, Chicago: I am gratified to note the favorable mention of disarticulation of the knee. Amputation through the knee joint, disarticulation, exarticulation or amputation in contiguity does not deserve the neglect and disrepute into which it has fallen. The fundamental principles here are very simple. The functions of the lower extremity are weight bearing and locomotion. End bearing is physiologic; side bearing is unphysiologic, inefficient and painful. The condyles plus the patella can provide a firm horizontal surface of 20 square inches, much larger than the end surface in the Gritti-Stokes or Callander operations, an obvious advantage because pressure per square inch is inversely proportional to surface area. The power of locomotion can be preserved and muscular atrophy prevented only by attaching all muscles and tendons to the end of the stump. Some disarticulation stumps have been unsatisfactory for one of two reasons. The patella has been tender because it has ridden loosely and freely on the front of the femur. The patella will fuse to the femur if its tendon is simply anchored; by dovetailing or pegging it can be fixed low enough to contribute to the end bearing surface area. Other stumps have undergone gradual atrophy and ulceration of their terminal integuments and even protrusion of the bone. If all tendons are attached to the end of the stump, however, neither of these complications will occur even after amputation at a very early age. I have recently described an original operation embracing three essential points: formation of a large anterior flap including skin fascia, synovium and patellar ligament in one piece, fixation of the patella in the anterior intercondylar groove with its lower hole level with the lower surfaces of the condyles, and suture of the patellar tendon to the hamstring tendons in the posterior intercondylar notch. This operation is called a physiologic amputation, because it distributes the body weight over the largest surface area available for end bearing, because it utilizes bony surfaces accustomed to weight bearing, and covers them with the amount and kind of soft tissues which bear weight elsewhere in the body, because it preserves the function of all tissues left in the stump, because it allows continued growth of the stump without atrophy of its integuments, and because it adapts itself to a prosthesis which resembles a normal leg and which is worn as a shoe is worn on the foot.

DR. FREDERICK H. VOM SAAL, Oklahoma City: I am amazed at what Dr. Key says. We have many good tibial amputations and the patients are well satisfied with them, and our experience, if anything, is just the opposite. We think that any length of the tibia down to an inch and a half, which is very short, is preferable to an operation at or above the knee.

THE INHERITANCE OF EPILEPSY AS REVEALED BY THE ELECTRO-ENCEPHALOGRAPH

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ERNA L. GIBBS
AND
F. A. GIBBS, M.D.
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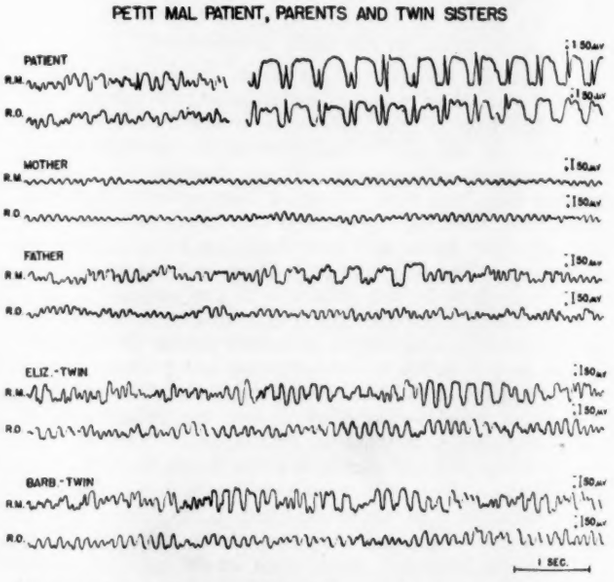
Though the opinion that heredity is an important influence in epilepsy is widespread, only one epileptic person in five is able to name any relative who has been similarly affected. Like an underground stream, the predisposition to seizures can flow unrevealed and unsuspected through numerous generations and then suddenly, assisted perhaps by some injury to the brain, appear in a certain individual as epilepsy. This predisposition, carried as it is in abnormal genes, has never been demonstrated in the clinical laboratory.

There are reasons for believing that a study of cortical electrical activity might clarify the problem of inheritance in epilepsy. This cortical rhythm, as recorded by the electro-encephalograph, is a fundamental constitutional characteristic. Evidence of this is the individuality of each person's electro-encephalogram and, what is even more convincing, the similarity of the electro-encephalograms of similar twins.[1] This similarity is observed both in twins with normal and in those with abnormal records. Epilepsy is a paroxysmal cerebral dysrhythmia.[2] Our studies have shown that rhythms of abnormal frequency are present not only during seizures but usually also in the intervals between.[3] Furthermore, an abnormal rhythm has been observed prior to a patient's first seizure. If dysrhythmia is a constitutional characteristic, it should be demonstrable in persons who have no epilepsy but only the predisposition. Although the frequency of the electrical waves of the brain varies with changing activity of the brain, an inheritable disorder which was present in the parent before the conception of the child should persist throughout life. Obviously, the most likely persons to examine for constitutional disorders are the nonepileptic near relatives of the epileptic. We began to study this group two years ago.

The present report deals only with records obtained by means of an ink-writing oscillograph. The more precise evidence from electrically analyzed records will be reported later. Patients were those coming privately to us or our colleagues or else attending the Neurological Service of the Boston City Hospital. They were unselected, and no attempt was made to eliminate so-called symptomatic epileptic persons, for a statistical study by one of us has shown that the symptomatic epileptic, in whom brain defect or injury antedated the first seizure, have three times more near relatives with seizures than the nonepileptic.[4] Simultaneous records were made over six cortical areas, since an abnormality of rhythm may be limited to one area. Records were run for at least twenty minutes and a short period of overventilation was used as a means of emphasizing abnormal patterns. Such induced abnormalities were not counted, however, unless they were the diagnostic wave and spike pattern of petit mal. The decision as to abnormality was made by one of us (E. L. G.) after inspection of the whole record. Abnormalities consisted of waves or series of waves which were abnormal in rate, with frequencies below nine per second or above twelve per second. Examination of some subjects was repeated without altering results. For comparison, electro-encephalograms were made of fifty healthy persons, mainly professional and other workers on the staff of the Neurological Unit who did not have a family history of epilepsy.

RESULTS

Records were made of 138 persons, of whom 100 were parents and twenty were siblings or children of seventy-six patients who had cerebral dysrhythmia and the clinical diagnosis of epilepsy. Of these 138 persons, 54 per cent had definite dysrhythmia (males 52 per cent and females 57 per cent). Eleven per cent had doubtful dysrhythmia. When both parents were tested, 60 per cent of these individual records were abnormal; when one of the parents was tested, only 31 per cent were abnormal. Presumably the normal parent was more willing or more available for the test. Of the control group, 6 per cent had definite and 12 per cent had doubtful dysrhythmia. Therefore, definitely abnormal records were nine times more frequent among those closely related to an epileptic patient than among those not related.



Portions of the electro-encephalographic records of a patient with petit mal epilepsy and (from top to bottom) his mother, father and younger identical twin sisters. Only leads from the right motor and occipital regions are shown. Of the patient's record the right hand portion was made during a petit mal attack, the left hand portion during a subclinical seizure. The mother's record is wholly normal. The father and two daughters have abnormally slow waves, predominantly in the motor area. The line at the bottom marks seconds, and at the right is the signal made by 50 millivolts.

In forty-six instances, records were obtained of both parents of the patient. In 28 per cent of these families the records of both parents were definitely abnormal. In 94 per cent the record of at least one of the parents was unmistakably abnormal. In 4 per cent

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From the Department of Neurology of Harvard Medical School and the Neurological Unit of the Boston City Hospital. Aid was received from the Rockefeller Foundation and the Harvard Epilepsy Commission.

1. Davis, Hallowell, and Davis, Pauline A.: Action Potentials of the Brain in Normal Persons and in Normal States of Cerebral Activity, Arch. Neurol. & Psychiat. **36**: 1214 (Dec.) 1936.
2. Gibbs, F. A.; Gibbs, E. L., and Lennox, W. G.: Epilepsy: A Paroxysmal Cerebral Dysrhythmia, Brain **60**: 377 (Dec.) 1937.
3. Gibbs, F. A.; Davis, Hallowell, and Lennox, W. G.: The Electro-Encephalogram in Epilepsy and in Conditions of Impaired Consciousness, Arch. Neurol. & Psychiat. **34**: 1133 (Dec.) 1935.
4. Lennox, W. G.: Epilepsy, in Nelson Loose-Leaf Living Medicine, 1933, vol. VI, chapter 31, p. 621.

the record of one parent was normal and of the other doubtful. In only one instance (2 per cent) was the record of both parents normal.

Samples of the records obtained in one family appear in the accompanying tracing. In this family a son, the patient, had petit mal epilepsy. The mother's record was entirely normal. The father's record showed periods of abnormally slow waves over the motor areas of the cortex. Two 10 year old sisters, who were identical twins, had records which were similar. Both, like the father, had abnormally slow waves principally over the motor areas. The only history of neuropsychiatric disorder in the family was a sister of the father, who was in a mental hospital.

For the most part, abnormalities were in the direction of slow, three to seven per second waves, many of square configuration. These square topped waves were often inverted. Abnormalities were most conspicuous over the motor areas. In only three instances was the diagnostic wave and spike formation of petit mal present, and one of these parents had had petit mal in childhood. The degree of abnormality varied. Occasionally a normal parent had a worse looking record than his epileptic child. Dysrhythmias of the type encountered in these parents are not found exclusively in patients with epilepsy but occur in many children with severe behavior disorders, in many schizophrenic patients and doubtless in other conditions as yet unexplored. Three of the 118 parents studied had had seizures in childhood. Some of the parents might be called "neurotic" or unduly apprehensive. However, we emphasize that rhythms which were grossly abnormal occurred in some of the most intelligent and emotionally stable of the relatives. Dysrhythmias may or may not be associated with symptoms of nervous disorder. The existence of gross cortical dysrhythmia in 6 per cent of our normal control group and of waves of questionable normality in another 12 per cent is not surprising. Persons with a "predisposition" to disease outnumber by many times those who actually have disease. Looking forward from this control group, we do not know what clinical disease those showing dysrhythmia (or their descendants) may be subject to. Looking back from our epileptic patients, we believe that dysrhythmias in parents must be associated with the epilepsy of their children. Among our near relatives of epileptic patients, approximately 2.5 per cent have, or have had, epilepsy, and approximately 50 per cent have definite cortical dysrhythmia. Therefore in this small group those with a predisposition to epilepsy outnumber the epileptic twenty to one.

The present study demonstrates that, even when a patient gives no history of epilepsy in his ascendants, one or both of his parents may have a cortical dysrhythmia. The conclusion seems inescapable that the cerebral dysrhythmia associated with epilepsy is inheritable and the parent of an epileptic patient who shows such cortical dysrhythmia is a carrier of the disorder. Epilepsy has long been recognized as a recessive mendelian trait. Our study suggests the possibility that cortical dysrhythmia, the essential manifestation of epilepsy, may be a dominant trait. Since epileptic persons form about 0.5 per cent of the population, those predisposed to epilepsy or a kindred disorder would number about 10 per cent. A mating of two predisposed persons by the laws of chance would occur only once in a hundred matings. Yet definite cortical dysrhythmia of both parents occurred in 28 per cent of our families. If an epileptic person marries, he should choose a person with normal brain waves. Marriage is safer for such a pair than for two persons whose personal and family histories are free of seizures but who both have cortical dysrhthmia.

CONCLUSIONS

Electro-encephalographic tracings were made simultaneously over six areas of the cortex in 138 parents, children or siblings of patients with epilepsy. Definitely abnormal records were obtained in 54 per cent of the relatives, against 6 per cent in a control group who were unrelated to epileptic persons. In forty-six of the families, records were made of both parents. In 28 per cent both parents and in 94 per cent at least one parent had abnormal records. We believe this evidence indicates that the dysrhythmia of epilepsy is inheritable and that such a dysrhythmia when demonstrable may represent a predisposition to epilepsy or some allied disorder.

These observations should be of practical value in the prophylaxis and eugenics of epilepsy and should assist the physician in tracing the descent of epilepsy and in advising patients and their relatives about marriage.

ABNORMAL MOVEMENTS FOLLOWING INJURY TO THE FACIAL NERVE

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Abnormal movements of the face following recovery from toxic neuritis of the facial nerve (Bell's palsy) are much more common than is generally supposed. Patients who recover from traumatic lesions to the nerve invariably show abnormal associated movements of the facial musculature and often have annoying tics on the affected side of the face.[1] Some patients, after the disappearance of the paralysis, suffer from sweating and excessive lacrimation on the injured side while eating (crocodile tear syndrome [2]).

Opinions as to the cause of these phenomena have been divergent. One school maintained that the ticlike movements are central in origin and the other that they are peripheral. Unfortunately, the two most assiduous workers in this field, the late Dr. Arthur B. Duel and the late Sir Charles Ballance, while studying facial nerve grafts disagreed as to the origin of the ticlike movements and, on different sides of the ocean, continued their experiments on the same material and published results without close collaboration. It was my privilege to work in the laboratory of the late Dr. Duel while certain crucial experiments as to the cause of this so-called facial tic were being conducted and to examine the material of the late Sir Charles Ballance as well. It is my purpose in this paper to report these experiments and to clarify the situation with regard to the divergent opinions.

Those who have read all the papers of Duel and Ballance will find that even in the early papers [3] both these workers were much concerned over the occurrence of a severe myoclonic spasm in the faces of all the

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1. Oppenheim, Hermann: Textbook of Nervous Diseases, ed. 5, translated by Alexander Bruce, Edinburgh, O. Schultze & Co., 1911.
2. Ford, F. R.: Paroxysmal Lacrimation During Eating as a Sequel of Facial Palsy, Arch. Neurol. & Psychiat. **28**: 1279 (Jan.) 1933.
3. Ballance, Charles, and Duel, A. B.: The Operative Treatment of Facial Palsy, Arch. Otolaryng. **15**: 1-70 (Jan.) 1932.

monkeys in which the nerve had been cut experimentally so that a graft from some other nerve in the body could be inserted. Ballance was convinced that the movements were central in origin, and to prove his theory the rolandic motor facial cortex of several monkeys was removed for microscopic study before the autopsy. These specimens were taken to England by Ballance and were the basis of a paper.[4] He reported that there

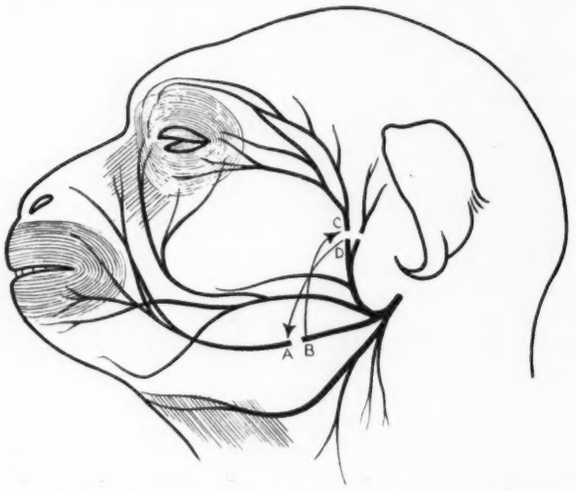

Fig. 1.—How the nerve trunks to the eye were switched to the lip and the branch previously enervating the lip was switched to the eye. Reeducation occurred with healing of the paralysis. There were no ticlike movements.

was a change in the pyramidal cells of the facial area of the motor rolandic cortex of the left side of all monkeys which had had a unilateral facial nerve graft on the right (that is, those monkeys which had an external traumatic lesion of the facial nerve). The conclusions were based on a comparison of the Nissl reaction of the pyramidal cells in specimens removed from the two sides. These experiments were continued by Duel after Ballance's return to England, with this difference: Monkeys were allowed to recover after the removal of the facial area in the rolandic cortex on the side opposite the peripheral lesion. The ticlike movements of the face were found to persist without change.

To make sure that the result was not due to incomplete ablation of the rolandic cortex, in two monkeys the entire rolandic motor area on the side opposite the peripheral lesion was removed, and in four monkeys the entire cerebral hemisphere was removed on this side; no change took place in the ticlike movements. In two monkeys, when the cerebral cortex was removed from both sides it was difficult to elicit the facial tic because of the condition of the monkey, but associated movements (which, with conjunctival irritation, invariably accompany the ticlike movements) were persistent on the side where the facial nerve had been cut and repaired. They were not present on the normal side.

The pyramidal cells of the motor cortex in these monkeys were stained by the Nissl method. The facial area was delineated with a faradic current and marked with silk threads before the removal of the specimen and the death of the animal, so that it could be compared with nearby areas as well as with the opposite side. No variation in the Nissl reaction of the pyramidal cells of either side was noted. Confirmation of this observation was given by Dr. Abner Wolfe of the Department of Neuropathology at Columbia University. Since these results were in complete disagreement with those of Ballance, Dr. Duel obtained from him the actual specimens from which his observations had been made. Dr. Wolfe and I examined these specimens and were not able to agree with Ballance as to the changes observed by him. Examination of the facial nuclei in the medullas of "ticking" monkeys also showed no abnormalities.

The Nissl reaction is notoriously difficult to interpret, and in our opinion the changes reported by Ballance are simply normal variations due to microscopic technic and inherent in the method, particularly when small specimens are used.

The ticlike movements seemed to be associated with the continued blinking of the eyes which is so characteristic of an excited monkey. It has been suggested that the true cause of the facial ticlike movements might be the fact that when the nerve repaired itself, single axons or entire nerve bundles became misdirected.[5] When they grew down they did not enter the sheaths which they had previously occupied, and therefore individual muscles would be enervated by cells in the medulla which had previously enervated other muscles. The resulting confusion might easily cause the associated movements and the ticlike movements as well. To prove this point, the skin was dissected forward on one side of the face of a series of normal monkeys and the peripheral branches of the facial nerve were isolated as they passed forward over the anterior border of the parotid gland. Mild faradic stimulation being used, a large branch which enervated the eye and another which enervated the lower lip were selected. When each was freed for a considerable distance and cut, the proximal trunk which had previously enervated the eye muscles was sutured to the distal portion of the branch that had previously enervated the lip muscles and, likewise, the proximal portion of the nerve that had

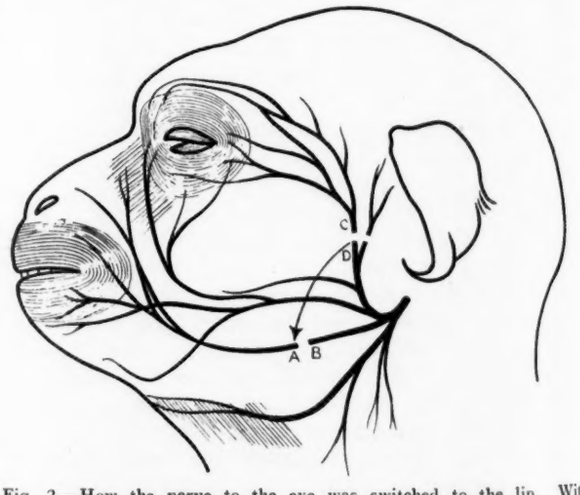

Fig. 2.—How the nerve to the eye was switched to the lip. With healing, spasmodic movements of the lip occurred which were synchronous with blinking of the normal eye on the other side of the face.

previously enervated the lip was sutured to the distal portion of the nerve which enervated the eye (fig. 1). The skin was then replaced and the monkey allowed to recover. For the first few days there were a partial inability to close the eye on the side which had been operated on and an obvious deformity of the lower

4. Ballance, Charles, and Duel, A. B.: A Note on the Large Pyramidal Cell of the Facial Area of the Left Rolandic Cortex. . . . Following Certain Experimental Operations Performed on the Right Facial Nerve, Dundee, Scotland, D. C. Thompson, 1934.

5. Spiller, W. G.: Contracture Occurring in Partial Recovery from Paralysis of the Facial Nerve and Other Nerves, Arch. Neurol. & Psychiat. **1**: 564 (May) 1919.

lip, but, with reenervation of the distal stumps, both deformities decreased steadily until, in a completely recovered monkey, there was no evidence of the paralysis and, what is more important, no associated movements or ticlike movements.

In two monkeys in which the enervation to the eye was attached only to the distal stump of the nerve to the lip, the orbicularis palpebrarum remained partially

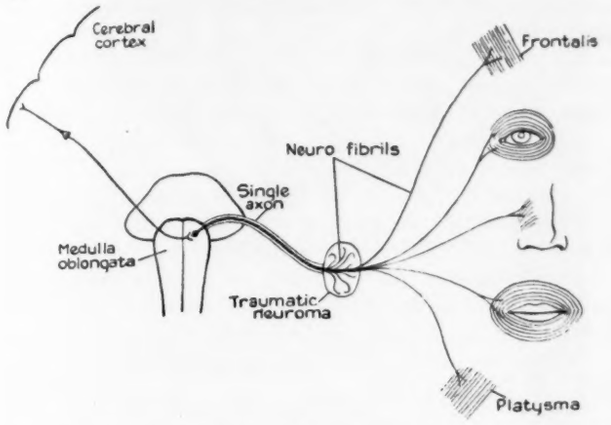

Fig. 3.—How a single axon can enervate several parts of the face and be responsible for abnormal associated movements.

paralyzed for months, while the movement of the lip returned in ten days (fig. 2). In these monkeys, blinking of the normal eye was associated with a movement of the lip on the side which had been operated on, and if the monkey was extremely excited or the conjunctiva on either side was irritated by a foreign body the twitching of the lip resembled the ticlike movements produced by cutting the main trunk of the facial nerve. Once established, this "blinking" of the lip remained constant (all the animals were observed for more than eight months).

In doing both these operations it was necessary to sacrifice a few small nerve tendrils in order to move the trunks from one part of the face to another. Apparently, neurofibrils from the proximal end of the cut nerve stumps grew across the intervening spaces, or possibly, but less likely, there was enervation of the paralyzed muscle bundles by new twigs from unparalyzed nerve trunks. In three months there was considerable recovery of the paralyzed eye on the side which had been operated on in the monkeys receiving no new enervation of the eye. After four months the eye could be completed closed. The distance from the loose proximal stumps to the external canthus of the eye in these monkeys was approximately 3.5 cm.

At this time Dr. Duel discovered that all his patients who had recovered with facial nerve grafts had the associated movements which were so apparent in the experimental animals. Some of the patients had annoying ticlike movements as well. Staring fixedly at them often made their faces twitch. Those with mobile faces, the unstable, excitable persons, were much more likely to twitch than the more stolid persons with "dead pan" faces. It was extremely difficult with human beings to be sure that the involuntary twitching of the entire face was associated with blinking of the eyes. The reason for this uncertainty is that the involuntary blinking of the human eye is often so rapid as to be indiscernible when the attention is fixed on a bizarre twitching of another portion of the face.

In this connection, the observation was made that traumatic lesions of the facial nerve in cats produced no tic which was comparable to that found in monkeys and occasionally in human beings. There was a peculiar excessive vibration of the whiskers while the paralysis lasted, but this in no way resembled the tic seen in monkeys and human beings. Its cause was not determined. Irritation of the conjunctiva in cats, when facial palsy healed, produced associated movements of all the muscles on the side which had been operated on, with much less movement of the whiskers on the normal side. When it was established that the ticlike movements were commonly associated with voluntary or involuntary blinking of the eyes in monkeys and human beings, the absence of this phenomenon in cats was explained by the fact that they rarely blink their eyes. When they do so, the movement is very deliberate and the associated movement is likewise very slow, so that both are much less apparent than in monkeys and human beings. Cats express their emotions more by arching the back and moving the tail than by facial expression.

During this stage in the search for the cause of facial tic, Duel performed a second operation and graft on two of his patients who had severe and annoying facial tic. When recovery from the facial paralysis occurred the second time, the tic was exactly as bad as it had been after the first repair.

At this point, Prof. Lewis Weed of the Department of Anatomy at Johns Hopkins University School of Medicine sent Howard A. Howe and Sarah S. Tower to the Laurelwood laboratories to study the problem. These workers suggested that the facial tic might be due to a splitting of the individual axons at the point of trauma and the enervation of several parts of the face by neurofibrils from a single axon. (A comparison of observations on the sciatic nerve of rabbits [6] is of interest.)

A series of experiments were then conducted on monkeys which had previously been subject to sufficient trauma of the facial nerve so that, with recovery, the

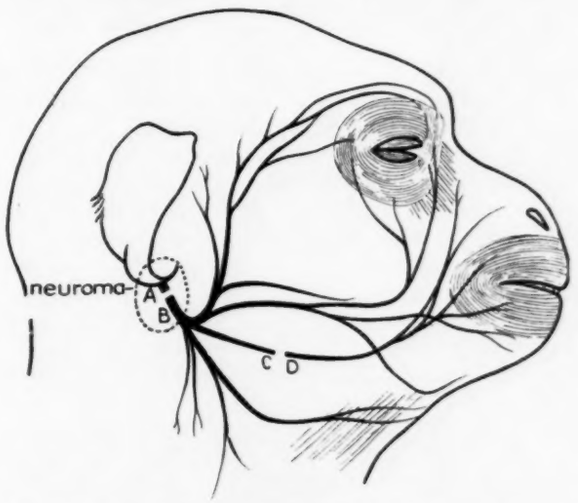

Fig. 4.—The Howe-Tower experiment. After repair at *AB* and cutting of the branch at *CD*, stimulation at *D* with faradic current produced movement of the lips and nose. Stimulation at *C* produced movement of the entire face including the ears and the platysma and frontalis muscles. On the normal side, with no lesion at *AB*, stimulation at *C* produced no reaction whatever.

typical associated movements and spasms were apparent. The skin was reflected over the parotid gland on both sides, and several peripheral branches of the facial nerve were isolated. The most typical trunks (fig. 3) were chosen. One of these branches was cut, and its counterpart on the normal side was also cut. The

6. Langley, J. N., and Anderson, H. K.: The Union of Different Kinds of Nerve Fibers, J. Physiol. **31**: 365, 1904.

distal stump (at *D*) was then stimulated with a mild faradic current and found to enervate a nearby, highly localized region on both sides. Stimulation of the proximal stump on the side which had been operated on, however, invariably produced movement of the entire face, scalp and platysma, while stimulation of

Fig. 5.—Traumatic neuroma in the facial nerve of a monkey.

the proximal stump on the normal side produced no movement whatever. These experiments have been reported in detail by Howe, Tower and Duel [7] and explain the true origin of the ticlike movements.

The stimulation of the proximal end of a cut peripheral branch which moves the entire face, even if the facial nerve has been severed in the internal auditory meatus, shows that on the injured and repaired side there is always enervation of several parts of the face by a single axon. Sections through the neuroma which is invariably present at the site of repair confirm the belief that this axon reflex is produced by a splitting of the neurofibrils at the point of repair. The individual axon passes into the neuroma and breaks up into neurofibrils which run in every direction (fig. 4), and those neurofibrils which happen to encounter peripheral branches of the severed facial nerve enter different branches. Thus a single axon may send out neurofibrils, of which some get lost in the fibrous tissue of the neuroma and others may reenervate distal branches which belong to the neck, lip, nose, eye or forehead or, conceivably, all these regions. That is, if any type of stimulus reaches the medullary cell belonging to this axon, it produces movement of several of the muscles of the face.

From the foregoing discussion it is apparent why the monkeys move the entire face on the affected side when they blink their eyes or even when they move the alae of their noses with fast respiration (Howe) and why human beings have ticlike movements of the face not only with blinking of the eyes but also with the more static function of trying to keep the face immobile.

I have seen one patient who had recovered from Bell's palsy in whom the new axons grew across the midline and produced twitching of the alae of the nose and parts of the lower lip and chin on the normal side coincidentally with any movements of the formerly paralyzed side of the face. There were also, of course, marked associated movements on this side.

It is obvious that inserting a new graft when there is an annoying facial tic will not produce reduction of the tic. It is practically impossible to believe that when the second set of neurofibrils grows down they will redistribute themselves any better than did the first set. Indeed, one might expect even a worse result.

If the typical ticlike twitching of the face is present, one may presume that there has been a peripheral lesion of the facial nerve and that repair has taken place. In this connection, the following case is of interest:

B. W., a Negro woman aged 45, a Christian scientist, presented herself at the Vanderbilt Clinic with a large subperiosteal abscess involving the whole mastoid, zygomatic and temporal region on the right side and a history of discharge from the ear on the right side of nine weeks' duration. A roentgenogram of the mastoid showed evidence of mastoiditis and cortical perforation on this side. In addition, the patient had paralysis of three weeks' duration on the left side of the face, which was much more apparent in the lower part than in her forehead. Since the disease had been neglected and the cortical perforation was present externally, it was suspected that she might have an epidural abscess involving the rolandic motor cortex on the right side. This theory was enhanced by the fact that when faradic stimulation was present on the left side no reaction of degeneration was apparent and the paralysis was confined to the lower portion of the face. However, the patient was extremely ill, and after evacuation of the subperiosteal abscess, which involved most of the right side of her skull, and the removal of the infected air cells of a very large mastoid cavity on this side, her condition was so extreme that it was deemed unwise to explore the epidural spaces, especially when no obvious break in the inner tables of the mastoid was apparent. The patient recovered quite rapidly after the operation and her facial

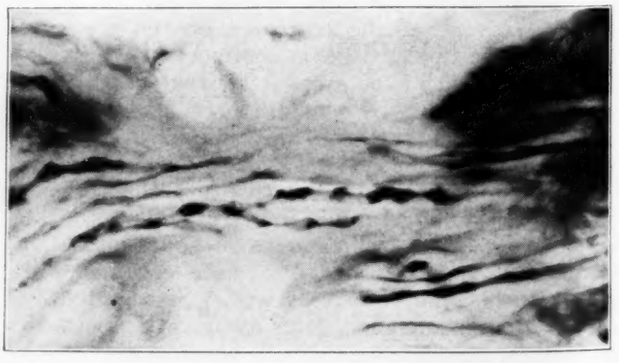

Fig. 6.—Branching axons from the neuroma shown in figure 5.

paralysis began to improve. She was loath to allow any further intervention. In fact, it was with great difficulty that she was persuaded to return occasionally to the clinic for dressings. I saw her about six months after the operation, and at this time her facial paralysis on the left was entirely healed except for the characteristic ticlike movements which are invariably present after peripheral traumatic lesions of the facial nerve.

The appearance of the tic in this case indicated that the facial paralysis was produced by toxic neuritis

7. Howe, H. A.; Tower, Sarah S., and Duel, A. B.: Facial Tic in Relation to Injury of Facial Nerve: Experimental Study, Arch. Neurol. & Psychiat. **38**: 1190 (Dec.) 1937.

(Bell's palsy) of the left side rather than by an infection of the rolandic motor cortex of the right side.

Unfortunately, experiments to ascertain the cause of facial tic and associated movements have resulted in an explanation which shows that when established they cannot be cured by any known technical method. On

Fig. 7.—Facial palsy following operative removal of a cholesteatoma which surrounded the facial nerve at the knee of its descending portion on the right.

the other hand, they can be minimized. If the facial nerve is exposed in a mastoid operation, it should be carefully avoided. If paralysis is present and a graft necessary, any uncut vestige of the nerve should be kept. The graft can be placed over this vestige, especially in cases of recent involvement. In cases of old involvement the neuroma should be shaved away from the nerve in an effort to save deeper lying portions of the nerve which may still be normal. This nerve should not be cut off sharply above and below the lesion, as advocated by Duel.[3]

The facial twitching can often be controlled after it develops. Patients who are annoyed by it must be trained to reduce their facial expressions. They can teach themselves not to blink so much. They can teach themselves to relax their faces to the "dead pan" type. Making or maintaining a so-called poker face requires definite muscular effort. Any movement, whether voluntary or involuntary, is likely to produce the very annoying twitch which they are trying to avoid. They should therefore train themselves in front of the mirror to smile out of the paralyzed side of the mouth. If they can achieve an even smile, it is a triumph. They should try every means to avoid being self conscious when some one is looking directly at them. Occasionally it is necessary to avoid direct gaze.

It has been found that some patients are much benefited by keeping a pipe or a cigaret holder in the paralyzed corner of the mouth. This reduces whatever deformity may be present and therefore the embarrassment of the patient. The less self conscious the patient becomes, the less his face moves. For this reason, if there is still a considerable deformity a year or two after a successful graft or decompression, a plastic operation should be used to straighten the face. Galvanic stimulation is a help to keep the muscles of the face exercised while they are not enervated. However, this may be overdone. As soon as reenervation takes place, it is wise to confine the galvanic exercises to those portions of the face which are not yet enervated. Sometimes the abnormal side has a tendency to be overactive because of the short circuited enervation, and this may well be exaggerated by excessive use of galvanic stimulation.

The etiology of the abnormal movements suggests that every effort should be made to relieve facial paralysis at the earliest possible moment. Thus the pressure of infection from otitic involvement of the nerve should be relieved at once by supplying adequate drainage. If the paralysis does not begin to disappear a few days after operation on the mastoid, decompression of the fallopian canal is indicated.

If directly after operation on the mastoid there is facial paralysis, the wound should be explored at once and the point of trauma found. Often this is simply a spicule of bone which has penetrated the sheath and permitted entrance of infection. If it is not, decompression of the nerve or a graft will be needed anyway, so no harm is done by operating. Decompression of the nerve has been shown to produce prompt alleviation of recurrent Bell's palsy, and therefore there is less

Fig. 8.—The patient shown in figure 7 two years after decompression of the injured part of the nerve on the right. Note the associated movement of the entire right side of the face, including the platysma.

chance for the abnormal movements to develop. Lastly, if faradic response disappears, and especially if reaction of degeneration can be demonstrated, decompression should seriously be considered for ordinary Bell's palsy, particularly the recurrent type. The fewer axons which degenerate, the fewer new axons there will be to break up and cause multiple enervation of the face.

CONCLUSIONS

1. Associated movements of various parts of the face occur after recovery with all severe injuries to the facial nerve.

2. Ticlike movements occur in patients with healed facial palsy of traumatic origin if they blink their eyes a great deal or have mobile faces.

3. The associated movements and facial spasms occasionally follow facial paralysis of toxic origin.

4. Both of these phenomena are caused by splitting of axons in the neuroma which invariably forms at a point of severe injury, whether toxic or traumatic. There is consequent enervation of several parts of the face by neurofibrils from a single axon.[7]

5. These phenomena are not caused by improper rerouting of nerve bundles because, when this is done experimentally, reeducation takes place so that no associated movement or ticlike movement occurs.

6. These phenomena are not central in origin.

7. The ticlike movements are pathognomonic of a peripheral nerve injury, and if they occur one can be sure that there has been trauma or severe toxic disturbance of the trunk of the nerve.

8. Every effort should be made to relieve peripheral nerve palsy as early as possible so as to forestall serious damage to the nerve and subsequent production of abnormal movements.

630 West 168th Street.

ABSTRACT OF DISCUSSION

DR. JOSEPH A. SULLIVAN, Toronto: I have been carrying on investigations in monkeys, and with information I have gained therefrom and deductions made from observations in practical experience in operating on 100 human beings with facial nerve palsies, and reinvestigating the histologic observations of Ballance, I cannot be as dogmatic as Dr. Fowler is in his conclusions. The author states "To make sure that the result was not due to incomplete ablation of the rolandic cortex, in four monkeys the entire cerebral hemisphere was removed on the side opposite the peripheral lesion without change taking place in the ticlike movements." Extirpation of the cerebral cortex does not necessarily mean that all the upper nuclei have been completely destroyed. From physiologic experiments we know that this is true, or its removal may have been so difficult that the medullary region has been injured. Dr. Fowler states in addition that "when the cerebral cortex was removed from both sides it was difficult to elicit the facial tic," owing to the condition of the monkey. I would appreciate it if he would explain this to me. I should like to know why he says that no variation in the Nissl reaction of the pyramidal cells of either side of the motor cortex was observed, closely following. The Nissl reaction is notoriously difficult to interpret. Were not all these monkeys operated on, immediately repaired or grafted? Had there been time for histologic changes to take place either in the pyramidal cells of the motor cortex or facial medullary nuclei. I do not think so, but there could be a physiologic disorder present, so ably propounded by Ballance and which I still adhere to. The isolation of the facial medullary nucleus is a most exacting procedure, and I cannot accept fully his statement that examination of the facial nuclei in the medulla of ticking monkeys showed no abnormalities; histologically may be so, physiologically no. I am in a position to demonstrate that the facial medullary nucleus does show a histologic change in a monkey whose facial nerve has been cut and allowed to undergo degeneration for varying periods of time before being repaired. I agree with Dr. Fowler that in fresh cases of facial nerve injury, if an uncut vestige of the nerve is present, this should be left and the graft placed alongside it. I do not agree, however, where in old cases a neuroma is present that it be shaved away without being completely excised. A neuroma means the presence of a marked neurofibrotic change in nerve tissue offering an impenetrable barrier to the downgrowth of neurofibrils. It is not feasible to leave any part of it, as how can we tell macroscopically if the deeper portions of this tissue are normal? I never hesitate in sharply excising it well beyond its limits, ensuring an accurate coaptation of nerve to nerve and thereby applying a fundamental neurosurgical principle.

DR. ERNEST SACHS, St. Louis: I suspect that the author asked me to discuss his paper because of a piece of work that was done by a former assistant of mine, Dr. Malone, on the regeneration of nerves. Dr. Malone proved conclusively that in order to get a satisfactory regeneration of the nerve it is essential to excise a neuroma completely. He also demonstrated that when nerves are brought together as accurately as it is possible to do there is nevertheless rotation in the axis cylinders. Observations made twenty years ago by the Belgian Dustin in connection with studies on the regeneration of the fifth nerve proved that one couldn't make the axis cylinders hook up with the branch from which it had been originally separated. The explanation that Dr. Fowler has brought forward explaining these particular movements by the splitting of the axis cylinders I am unable to express any opinion about. Dr. Malone didn't see any split axis cylinders, but the mere fact that we didn't see it doesn't mean that they do not occur. Neurosurgeons are deeply interested in the regeneration of the facial nerve, because in the operation on the eighth nerve tumors they are often obliged to divide the seventh nerve, and the problem of how to get the best regeneration comes up. One sees associated movements when one puts a hypoglossal nerve into the seventh nerve. When the patient recovers he frequently gets an associated movement; in fact, we want him to have it. That is, when he moves his tongue he contracts his face, but I have never seen anything like a tic movement. I agree that the origin of the tic is not cortical. Many years ago I worked with an intimate colleague of Sir Charles Ballance, Victor Horsley. They did not agree that the tic movements do not originate or resemble the movements that one gets when one stimulates the cortex, and I have never been able to accept the point of view that a true tic movement is anything other than of peripheral origin. Which part of the peripheral mechanism it occurs in, I am unable to say.

DR. EDMUND P. FOWLER JR., New York: In answer to Dr. Sullivan, all the monkeys here reported were late cases, that is, were monkeys that had had a facial graft one or two years or at least six months before. If a peripheral nerve is cut, there are no changes in the dorsal ganglions (the counterpart of the medullary facial nucleus) except at the beginning. One must furthermore cut the nerve close to the dorsal root ganglions in order to get changes. Similarly, one would have to cut the facial nerve close to the medulla and examine it early in order to get cloudy swelling and acute changes in the cells of the medullary facial nucleus. This I have not done. It was mentioned that the Nissl stain is difficult to interpret. I had the privilege of seeing Sir Charles Ballance's sections, and in my opinion the cells that he considered abnormal are histologic artefacts which are inherent in the difficulties of the method. With regard to the removal of the neuroma, it is quite true that in peripheral nerve surgery the best results are obtained by removing the entire neuroma. In facial nerve surgery I don't think this is so. After all, the most important thing in facial nerve surgery in the temporal bone is the decompression of the nerve. When the nerve is cut, especially by a bullet or an inept slice of a curet, the regenerating nerve has to hit a bull's eye; it has to hit an opening in the fallopian canal, which is very small. When we do facial nerve surgery, what we do is to take that bull's eye and make a trough. The graft acts only as a sluice-way for the new neurofibrils to grow down, and I don't think it makes enough difference if a little neuroma is left on top of what may be good, viable nerve fibers below. In answer to Dr. Sachs's question: Sir Charles Ballance's anastomosis monkeys had two kinds of associated movement. On irritation of the conjunctivas there was associated movement of the entire face as well as the associated movement of the tongue with hypoglossal anastomosis and lifting of the shoulder with accessory anastomosis. There was "winking" of the whole operated side of the face with conjunctival irritation of either eye. This I consider to be the same mechanism as the ticlike movements.

ANGIO-ENDOTHELIOMA OF BONE

J. FLETCHER LUTZ, M.D.
AND
LEWIS C. PUSCH, M.D.
YORK, PA.

Ewing [1] said in 1928:

> The knowledge of endothelioma of bone has progressed slowly because of the difficulty of establishing its exact origin, and from the fact that many other tumors simulate the structure of endothelioma. Yet the new evidence accumulated during the past few years has considerably clarified this subject, while leaving several important questions still unsolved. One of the chief difficulties arises from the occurrence of metastatic tumors, chiefly from the kidney, which closely resemble certain primary tumors of bone, for which an endothelial origin seems practically certain. Metastatic adrenal tumors also present much the same structure, and the same difficulty. Yet it is now clear that there is a primary endothelioma of bone, with large clear cells and a marked tendency to angiomatous structure. . . . Another source of error, especially with tumors of large, clear cells, lies in the occurrence of liposarcoma of the bone-marrow, which produces a structure very nearly identical with that of some tumors generally classed as endothelioma. . . . It is now sufficiently attested that primary endothelioma of bone occurs in several subvarieties, in which the gross anatomy, structure, and clinical course are rather specific.

Ewing defined three structural varieties: (1) angio-endothelioma, which is solitary, cystic or telangiectatic; (2) multiple endothelioma, and (3) diffuse endothelioma, or endothelial myeloma (Ewing's tumor). It is the first of these three varieties, angio-endothelioma of bone, in which we are especially interested.

Kolodny [2] declared in 1926: "With the exception of a few, the most prominent pathologists hesitate to admit that angio-endothelioma of bone is an actual pathologic entity." The most outspoken among the pathologists, Ribbert [3] said: "In no instance has it been proven that a so-called endothelioma originated from endothelium." The questions that suggest themselves to an unbiased investigator are "Is angio-endothelioma of bone a true pathologic entity? If so, what is the clinical incidence of this tumor."

Codman [4] stated of this very rare bone tumor that until 1925 not a single case had been recorded in the Registry of Bone Sarcoma of the American College of Surgeons. Kolodny [5] found two cases of angio-endothelioma in the registry, which he himself had reported, one in 1924 and one in 1926. There are now seven angio-endotheliomas listed, one in the humerus, one in the tibia, two in the fibula, two in the femur and one multiple. However, perusal of the literature demonstrates that not all cases have been recorded in this registry. Ewing further stated that this tumor develops in the ends or shafts of the long bones, that it grows steadily, often perforating the shaft, invades the soft tissues and usually produces pulmonary metastases. The tumor may pulsate or yield a bruit and may be mistaken for bone aneurysm. It affects chiefly adults and elderly subjects.

From the Departments of Radiology and Pathology, York Hospital.
Read before the Section on Radiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Ewing, James: Neoplastic Diseases, Philadelphia, W. B. Saunders Company, 1928.
2. Kolodny, Anatole: Angio-Endothelioma of Bone, Arch. Surg. **12:** 854 (April) 1926.
3. Ribbert, Hugo: Geschwulstlehre, Bonn, F. Cohen, 1914, p. 245.
4. Codman, E. A.: Bone Sarcoma, New York, Paul B. Hoeber, Inc., 1925.
5. Kolodny, Anatole: Bone Sarcoma, Chicago, Surgical Publishing Company, 1927.

Warner and Singleton [6] in 1933 said: "Much confusion has existed regarding this tumor; its rarity and its resemblance microscopically to secondary adenocarcinoma frequently make diagnosis from sections difficult." A close resemblance to secondary bronchiogenic carcinoma in bone has been noted by Hirsch and Ryerson.[7] Angio-endotheliomas are seldom diagnosed clinically or radiologically. They are radiosensitive and are not as apt to metastasize as are the other forms of endotheliomas or osteogenic sarcoma. When they do metastasize it is usually to the lungs.

Clinically, these tumors do not differ from any other form of sarcoma. They grow fairly rapidly and are painful and sensitive to the touch. They are generally solitary. There may be pulsation and a bruit.

Radiologically they are of bulky, cystlike formation, with fine lacelike trabeculae throughout. The wall is ill defined and has a tendency to blend with the soft tissues.

Fig. 1.—The lesion before amputation, showing its lacelike pattern.

There is marked destruction of bone without production of bone. The tumors resemble giant cell tumors, for which they have been mistaken radiologically. Giant cell tumors have specific radiographic signs which differ materially from those of angio-endotheliomas of bone. They are located mainly or exclusively in the epiphysis. They have a markedly widened shaft, preservation of the periosteal line and a sharp demarcation at the diaphysial border and are of multicystic appearance.

Brailsford [8] in 1934 described this type of tumor as "hemangio-endothelioma of bone." According to him it produces a characteristic radiographic appearance. He stated that such neoplasms are relatively uncommon and are found in the bones of elderly patients, and that

6. Warner, W. P., and Singleton, A. C.: Canad. M. A. J. **29:** 610, 1933.
7. Hirsch, E. F., and Ryerson, E. W.: Metastases of the Bone in Primary Carcinoma of the Lung, Arch. Surg. **16:** 1 (Jan.) 1928.
8. Brailsford, James F.: Radiology of Bones and Joints, Baltimore, William Wood & Co., 1934.

the involved bones show a cystlike expansion with well defined septums. They have been seen in the long bones of the extremities and ribs and in the pelvis and vertebral column. He described a patient 60 years of age whose ninth left rib was involved. The growth had been diagnosed clinically as an aneurysm, owing to the presence of pulsation and bruit, which are sometimes present with that condition. Haswell Wilson reported that on microscopic examination the lesion was found to be a malignant hemangio-endothelioma. This is the only definite radiologic description in the various radiologic publications.

REPORT OF CASE

(Registry of Bone Sarcoma, No. 2156, American College of Surgeons)

History and Course.—A white woman aged 54, referred to one of us (J. F. L.) by Dr. Julius Comroe of York, Pa., Sept. 7, 1937, for an x-ray examination of the shoulder, traced the onset of symptoms to June 1936, when she was given a hypodermic injection for the relief of a supposed attack of coronary occlusion. The arm gradually began to swell at the site of the injection. Some time later a well defined mass was noted over the upper third of the arm. This mass continued to grow. The patient suffered continuously from pain in this region, which was aggravated by the least movement, and the region was exquisitely tender to the touch. Roentgenologic study revealed in the upper and outer third of the right arm a circumscribed mass of cystlike formation, measuring 14 cm. in the longitudinal and 8.5 cm. in the transverse diameter. The cortex was ill defined and showed a tendency to blend with the soft tissues. There were numerous striae, or trabecular markings, giving the tumor a telangiectatic appearance. The reticulation had more of a lacelike effect. The shaft of the humerus in the region of the tumor was completely destroyed. No other bones were involved.

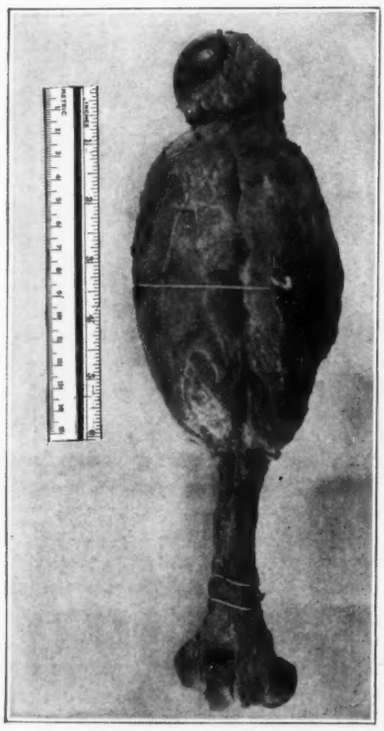

Fig. 2.—The gross specimen. A bulky fusiform swelling had replaced more than the upper half of the shaft of the humerus. Very little of the surface was osseous.

From September 9 to October 25 the patient was given high voltage roentgen therapy at 200 kilovolts and a target distance of 50 cm., with a filter of 1 mm. of aluminum and 0.5 mm. of copper and two ports of entry, 1,674 roentgens being used over each port. From Dec. 13, 1937, to Jan. 5, 1938, the Thoraeus filter was substituted for the aluminum and copper filter, and 832 roentgens was used over the port; there were still two ports of entry, anterior and posterior, each being 10 cm. in diameter. These high voltage roentgen treatments relieved the pain. After the last treatment the patient was advised to have the arm amputated and this was done by Dr. John Bacon at York Hospital January 17.

March 12 a film of the chest showed slight fibrosis but no evidence of metastasis. There was some cardiac enlargement associated with the hypertension from which the patient had been suffering for a number of years. On this date too an examination of the genito-urinary tract showed no evidence of a tumor in the region of either kidney.

After recovery from the operation the patient remained well and active, without indication of recurrent or metastatic neoplastic disease, until rather sudden death at home June 27, apparently from coronary occlusion. No autopsy was performed.

The Structure of the Lesion.—On dissection of the amputated arm, including longitudinal hemisection of the humerus, a fusiform swelling of the shaft of the humerus, 8 cm. in diameter, was found to extend downward 13 cm. from the surgical neck, replacing the shaft of the upper half of the bone. The interior was soft and friable, partly dark red, partly grayish red and partly pale grayish yellow. It included numerous small, smooth lined cysts, none over 1 cm. in diameter. Bloody fluid flowed from the mass on incision. The periphery, well demarcated, was composed of a shell of fibrous tissue in which ligamentous and muscular tissues were incorporated. Little of this periphery was ossified, and no calcified substance was found within the interior of the mass. The remainder of the medullary cavity of the humerus was filled with dark red marrow, which was not well demarcated from the substance of the tumor.

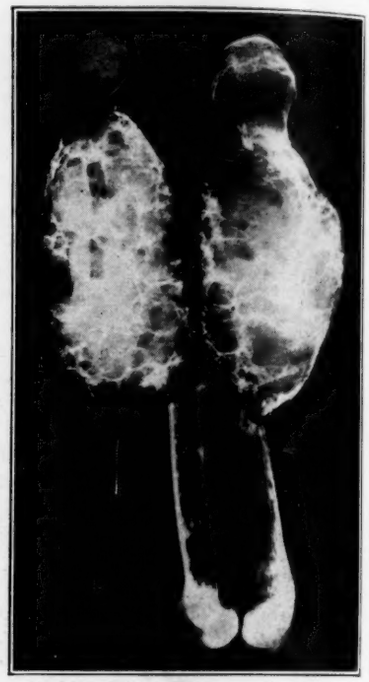

Fig. 3.—The bisected specimen after amputation, with the lacelike pattern accentuated. The fracture occurred at the time of amputation.

Microscopically, most of the substance of the tumor, including almost all its interior, was seen to be necrotic. Viable portions about the periphery consisted of ramifying columns of cells with bulky clear cytoplasm and rather pale vesicular nuclei, in most of which one or more prominent nucleoli were seen. These cells were moderately pleomorphic. Although in some places they appeared as solid cords, in general they surrounded lumens. Some lumens were narrow and empty, while others were filled with blood. Some of the blood-filled lumens were wider than the diameter of the low power microscopic field, with long narrow papillary projections of the bulky cells suspended in them. In addition, the tumor was traversed by numerous vascular channels of variable diameter, with a flattened endothelial lining, some of which were very wide and cavernous. There was but little supportive stroma; most of this was markedly hemorrhagic and edematous, giving the impression that these portions of the tumor were embedded in pools of blood. A thick fibrous capsule bordered the tumor but was poorly developed where the tumor met the marrow. Invasive capacity at the periphery nowhere was apparent. Vascular invasion was not observed.

COMMENT

Despite scattered case reports, the chief source of knowledge of angio-endothelioma of bone, of which we regard the foregoing case to be an example, is Ewing's[1] now classic book "Neoplastic Diseases." His description of the lesion as a solitary, bulky, cystic or telangiectatic tumor of the shafts or ends of long bones, occurring in adults, fits our case and undoubtedly is typical, but, as Crowell[9] has pointed out, the lesions are not all bulky and not all cystic. They expand and destroy the shaft and often penetrate the adjacent soft tissues.

9. Crowell, N. C.: Personal communication to the authors.

The absence of demonstrable pulmonary metastases in our case is in keeping also with Ewing's statement that these occur later than with osteogenic sarcoma. In our case too the changes coincide with Ewing's description of the microscopic features of angio-endothelioma of bone in that the tumor presented solid columns, solid acinar groups and alveoli and channels composed of, or lined by, large cuboidal or cylindric cells with bulky clear cytoplasm; sharply defined cell walls and small nuclei.

Although it is true that such a structure is compatible with metastatic adenocarcinomas of the adrenal gland and of the kidney, there was no indication of a primary lesion of these structures in our case. Ewing [10] stated that it has been a long time since he has seen such a typical example of angio-endothelioma of bone, that he feels it should be so classified, but that

Fig. 4.—Longitudinal bisection of the humerus, showing the partly solid and partly cystic interior of the tumor. The pale tissue composing the bulk of the tumor was in a state of coagulative necrosis, the probable effect of irradiation.

somehow he fears that a fat cell tumor could assume such a configuration. Since receiving his communication we have stained frozen sections of formaldehyde-fixed tissues with sudan III, and, although fat was demonstrated in areas of degeneration and necrosis, the viable and more mature neoplastic cells did not have the fat content characteristic of lipogenic neoplasms. Broders [11] agrees with the diagnosis of hemangio-endothelioma of bone, of the type which resembles adenocarcinoma of the kidney, or so-called hypernephroma, and regards this tumor as of grade 1 malignancy.

Three features of the structure may bear emphasis. There was destruction of bone without formation of bone. The expanded cortex had been replaced, except for a few fragmentary osseous remnants, by a stiff fibrous tissue shell. The fact that all the mass except the periphery was in a state of coagulative necrosis indicated the radiosensitivity of the lesion, the failure of reduction in size after irradiation undoubtedly being due to the coagulated state of the interior and the lack of collapsibility of the stiff fibrous wall.

It may be well to add a paragraph distinguishing the lesion we have described from that designated as

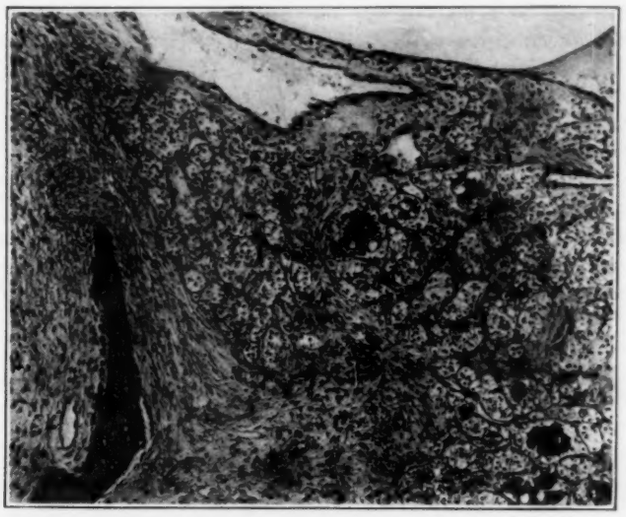

Fig. 5.—Viable periphery of the tumor under low power. The cysts are seen to have a telangiectatic pathogenesis. The fundamental structure of the tumor is seen to be represented by acini of large clear cells, some having blood-filled lumens.

angioma of bone or as hemangioma of bone. The latter lesion is characterized—despite a roentgenologic soap bubble-like appearance—clinically by a benign course, anatomically by a subcortical location and histologically by the usual well differentiated structure of any pure angioma. Geschickter and Copeland [12] ably portrayed these features. Undoubtedly many angio-endotheliomas of bone have been classified as benign angiomas. Confusion too has existed between angio-

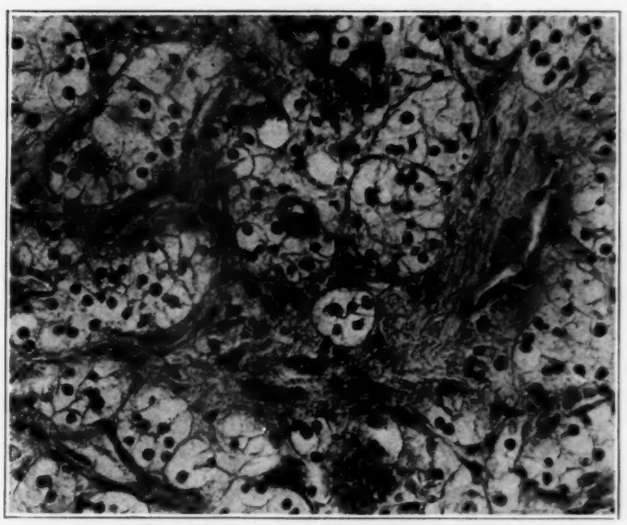

Fig. 6.—In higher magnification the cells of the neoplasm are seen to exhibit but little pleomorphism; the cytoplasm is bulky and relatively clear; the nuclei, although here appearing hyperchromatic, were vesicular, with macronucleoli.

endothelioma and endothelial myeloma, known as Ewing's sarcoma, since both were described by Ewing and since both are regarded as having an endothelial histogenesis.

10. Ewing, James: Personal communication to the authors.
11. Broders, A. C.: Personal communication to the authors.
12. Geschickter, C. F., and Copeland, M. M.: Tumors of Bone, revised edition, New York, American Journal of Cancer, 1936.

SUMMARY

Angio-endothelioma of bone occurred in the shaft of the humerus of a woman aged 54. In one and one-half years it reached a size of 13 by 8 by 8 cm. It expanded and destroyed the shaft but was well demarcated from soft tissues. It was multilocularly cystic but chiefly solid, contained blood and roentgenologically was characterized by a soap bubble-like appearance. Blood-filled tubular columns of cells having bulky clear cytoplasm characterized it microscopically. After preoperative irradiation, only the periphery of the tumor was viable at the time of amputation. The patient died suddenly six months after amputation, apparently from coronary occlusion; no autopsy was performed. There had been no evidence of recurrence, of metastasis or of any tumor elsewhere in the body.

ABSTRACT OF DISCUSSION

DR. CHARLES F. GESCHICKTER, Baltimore: A few years ago it would have been embarrassing to open this discussion, because I was convinced there wasn't any such thing in bone as angio-endothelioma; but today we have to admit that all forms of pathologic involvement of the bone of a neoplastic character have not been described. The authors have recorded every case in the literature which I would include if I had to write on this subject. Their case looks as if it would be metastatic hypermyeloma of the kidney. The first experience with a case that helped me change my mind was in the rib and it looked like this tumor was vascular. The rib was resected and there never has been a recurrence of the primary tumor, and that was eight years ago. In my second case I diagnosed from the roentgenogram a primary benign giant cell tumor. It was explored, thought to be metastatic, and the patient died without a primary source demonstrable at autopsy. We know these tumors in the rib are related to the mesothelial of the pleura and, in the ends of bones near joints, to the synovial membrane. They might be called mesothelioma or synovioma of bone. The only objection to the term "endothelioma" is that it has been so widely misused. My conception is that these tumors arise from primitive mesoderm around joints and may occasionally be found in bone. The important point of view from the standpoint of radiology is that there are such tumors, usually in the ribs, occasionally in the ends of the bones or about the joints. They are not metastatic, they are moderately radio sensitive but not radio curable, and these patients should have the benefit of radical surgery. If in doubt, one is doing a better job if one treats it as primary rather than secondary growth.

DR. JOHN T. MURPHY, Toledo, Ohio: Bone tumors are rare. If you see one, try and follow it as carefully as you can, from a radiologic and clinical standpoint. The clinical course of the disease is the final test of the diagnosis. If you see a bone tumor and you make two standard views and it is an early case, you are not completely examining the patient. Plates should be made from many angles, so that the lesion can be examined all the way round. Stereoscopic films also should be made. If cases are examined this way the radiologic diagnosis of bone tumors can be improved.

DR. J. FLETCHER LUTZ, York, Pa.: From a radiologic standpoint little has been done on this particular tumor. I showed the roentgenograms of this tumor to numerous radiologists at the International Congress of Radiology at Chicago and it was not once intimated that the tumor might be an angio-endothelioma of bone. I showed it to Dr. Murphy and he said "I would like to see a biopsy." He would not commit himself. I would like also to quote the late Dr. Bloodgood, with whose views I know Dr. Geschickter is familiar. Dr. Bloodgood said that even the most eminent pathologists, when they have to depend on a slide alone, frequently make mistakes and that it was only a correlation of all the factors in the case that made a correct diagnosis possible.

GRANULOCYTOPENIA IN SULFAPYRIDINE THERAPY

VERA B. DOLGOPOL, M.D.
AND
HAROLD M. HOBART, M.D.
NEW YORK

The recent introduction of sulfapyridine as a chemotherapeutic agent offered the possibility of successful treatment of infections caused by the pneumococcus, irrespective of its type. This drug was also found to give encouraging results in the treatment of miscellaneous other infections (streptococcic, gonococcic and others) and is consequently being used quite extensively.

Whitby [1] and Wien,[2] in their animal experiments, found sulfapyridine to be less toxic than other sulfonamide preparations, and it was thought for some time that this drug would not cause any depression of the function of the bone marrow as had been observed in a number of cases of neoprontosil and sulfanilamide therapy.

Several series of observations on sulfapyridine therapy in large groups of patients failed to reveal any grave drop in the number of white blood cells (Evans and Gainsford [3] 100 cases, Rosenthal [4] 150 cases, Anderson and Dowdeswell [5] 50 cases). The lowest figure obtained by the first two authors in one case was 4,200 white blood cells per cubic millimeter of blood.

Lloyd and Johnson,[6] however, in a series of 250 patients treated with sulfapyridine noted that in a small number a slight but definite leukopenia occurred, with a decrease in the number of polymorphonuclears; the erythropoietic system was apparently not affected. No figures of actual blood counts were mentioned in the article. On the basis of their observations the authors warned about prolonged treatment with sulfapyridine without a close watch over the blood count.

In the same issue of the *Lancet*, Johnston [7] reported a case of granulocytopenia following sulfapyridine therapy in puerperal sepsis. The lowest white blood cell count was 1,200 cells, with 8 per cent polymorphonuclears; the subsequent examinations of the blood showed slightly higher total figures for the white blood cells and from 0.5 to no polymorphonuclears. The patient died of septic endocarditis. The brief necropsy report makes no mention of the examination of the pharynx or of the bone marrow.

A few weeks later Coxon and Forbes [8] reported a nonfatal agranulocytic angina in a patient with typhoid who was treated with sulfapyridine for thrombophlebitis. The total number of white blood cells fell to 1,000, with no polymorphonuclears. The authors pointed out that, although the action of the drug was definitely implicated in causing granulocytopenia, the natural leukopenia of the typhoid could be considered as a contributing factor in the development of the condition.

From the pathologic laboratories and from the pertussis service of Willard Parker Hospital.

1. Whitby, L.: Chemotherapy of Infectious Diseases, Lancet **2**: 1095, 1938.
2. Wien, R.: The Toxicity of 2(p-Aminobenzene Sulfonamide) Pyridine, Quart. J. Pharm. & Pharmacol. **11**: 217, 1938.
3. Evans, G. M., and Gainsford, W. F.: Treatment of Pneumonia with 2-(p-Aminobenzenesulfonamido) Pyridine, Lancet **2**: 14, 1938.
4. Rosenthal, Lazar: Personal communication to the authors.
5. Anderson, T. F., and Dowdeswell, R. M.: Treatment of Pneumonia with M & B 693, Lancet **1**: 252, 1939.
6. Lloyd, V. E., and Johnson, A. G.: Lancet **2**: 1160, 1938.
7. Johnston, F. D.: Agranulocytosis Following Treatment with M & B 693, Lancet **2**: 1200, 1938.
8. Coxon, R. V., and Forbes, J. R.: Agranulocytic Angina Following Administration of M & B 693, Lancet **2**: 1412, 1938.

In a recent issue of THE JOURNAL two papers briefly mentioned cases of depression of the bone marrow.

Barnett and his associates,[9] in the addendum to their paper, communicated that one of their patients developed granulocytopenia with tonsillitis (75 white blood cells per cubic millimeter of blood, with no granulocytes). Although the number of white blood cells rose subsequently to 22,500, the patient died of a complication of the agranulocytic angina (hemorrhage from the incised cervical lymph nodes and from the pharynx). In another case of their series a single count of 4,800 white blood cells was recorded.

Flippin and his co-workers [10] have observed a leukopenia of 1,800 cells per cubic millimeter "with a normal differential." [11] The authors also observed in several instances a marked reduction in the number of red blood cells and of the amount of hemoglobin.

Hodes and his associates [12] have seen five mild cases and one severe case of granulocytopenia in their series of seventy-one cases. In one case the white cell count was 4,200 per cubic millimeter with 8 per cent granulocytes.

Cases of significant granulocytopenia were seen also by Bullowa.[13]

To this series of observations, showing the possibility of depression of the bone marrow by sulfapyridine, we add two cases of granulocytopenia and two cases of definite leukopenia. One case of granulocytopenia complicated by a mild aplastic anemia was fatal. These cases were observed at the Willard Parker Hospital in a series of thirty-five cases of pertussis and pneumonia treated with sulfapyridine.

REPORT OF CASES

CASE 1.—*Granulocytopenia.* A Negro girl aged 4 years, who had had pertussis since Jan. 1, 1939, was admitted to the Willard Parker Hospital January 25, when the cough had become more severe with emesis and bronchitis. The temperature was normal. There were no other complications.

TABLE 1.—*Granulocytopenia in Case 1 After 49 Gm. of Sulfapyridine*

	Blood														
Date	Erythrocytes	Hemoglobin	Leukocytes	Neutrophils	Lymphocytes	Monocytes	Eosinophils	Basophils	Myeloblasts	Plasma Cells	Peroxidase Reaction	Nucleated Erythrocytes	Therapy	Sulfapyridine in Blood	Platelets
2/5	3,640,000	75	11,500	38	54	8	..	..	..	..	..	0	Sulfapyridine		
2/15	4,400,000	70	11,100	67	26	1	1	..	..	..	..	5 in smear	Sulfapyridine		
2/17	.....	..	.....	..	..	..	..	..	..	..	..	..	Sulfapyridine and pneumococcus serum	9 mg.	
2/21	2,770,000	67	2,000	0	96	..	..	..	..	..	..	0	Transfusion		
2/22	.....	..	.....	..	..	..	..	4	..	..	..	..	Transfusion		
2/24	2,640,000	75	2,100	0	97	..	..	..	3	..	0	0	Transfusion Liver extract Pentnucleotide		
2/25	2,660,000	65	1,950	0	96	1	2	..	1	..	0	0	Liver extract Pentnucleotide	0	105,000
2/28	3,700,000	70	2,450	0	92	..	..	..	7	1	..	0			

Bone Marrow						
Date	Primitive Cells	Myeloblasts	Promyelocytes	Basophil Myelocytes	Plasma Cells	Lymphocytes	Nucleated Erythrocytes
2/25	1.5	5.5	2.5	0.5	1	89	4 to 100 WBC

TABLE 2.—*Granulocytopenia in Case 2 After 27 Gm. of Sulfapyridine*

	Blood												
Date	Erythrocytes	Hemoglobin	Leukocytes	Segmented	Band	Metamyelocytes	Myelocytes	Promyelocytes	Myeloblasts	Lymphocytes	Monocytes	Peroxidase Reaction	Therapy
2/3	3,720,000	55	14,350	42	..	..	..	..	..	50	8	..	Sulfapyridine
2/18	4,900,000	60	3,100	5	..	..	..	..	..	95	..	..	Sulfapyridine discontinued
2/24	3,620,000	45	2,500	0	..	..	..	.	..	100	..	0	
2/26	.....	..	.....	..	..	..	..	..	..	..	..	..	Transfusion Liver extract
2/27	5,000,000	70	4,150	..	..	1	3	3	16	70	7	18	Transfusion Liver extract
2/28	3,380,000	60	5,000	2	4	5	9	4	9	59	8	..	Liver extract
3/1	4,120,000	60	8,500	25	..	..	2	..	..	70	3	..	Liver extract

February 5, twelve days after admission, the temperature was 104 F. and respirations were 50 per minute. Physical signs of pneumonia were present in the area of the right lower lobe and were confirmed by x-ray examination. Sputum (pharyngeal swab) revealed a type VI pneumococcus. There was no growth on blood culture.

Sulfapyridine therapy was started February 5. Two Gm. was given as the initial dose and 3 Gm. daily as the maintenance dose. The temperature returned to normal within forty-eight hours and the patient seemed improved. The blood concentration of sulfapyridine at this time was 10 mg. However, physical signs of pneumonia persisted and sulfapyridine administration was continued until February 13. Twenty-five Gm. was the total amount of the drug given until this time.

February 15, two days after the sulfapyridine was discontinued, the temperature rose to 103 and respirations to 40 per minute. The child became toxic and dyspneic. Physical signs of pneumonia persisted in the right side of the chest and x-ray examination revealed a consolidation of the right middle lobe. Examination of a pharyngeal swab showed a pneumococcus type VI once more, and the blood culture was sterile. Sulfa-

9. Barnett, H. L.; Hartmann, A. F.; Perley, Annie M., and Ruhoff, Mary B.: The Treatment of Pneumococcic Infections in Infants and Children with Sulfapyridine, J. A. M. A. **112:** 518 (Feb. 11) 1939.

10. Flippin, H. F.; Lockwood, J. S.; Pepper, D. S., and Schwartz, Leon: The Treatment of Pneumococcic Pneumonia with Sulfapyridine, J. A. M. A. **112:** 529 (Feb. 11) 1939.

11. As the absolute number of polymorphonuclear leukocytes in the blood of a small child is usually above 2,500 and in an adult over 3,500, a total count 1,800 cells must be regarded as a significant neutropenia, irrespective of a normal differential count.

12. Hodes, H. L.; Stifler, W. C., Jr.; Walker, Ethel; McCarty, Maclyn, and Shirley, R. G.: The Use of Sulfapyridine in Primary Pneumococcic Pneumonia, J. Pediat. **14:** 417 (April) 1939.

13. Bullowa, J. G. M.: Personal communication to the authors.

pyridine was started again with the same dosage but with no apparent response.

The concentration February 17 was 9 mg. per hundred cubic centimeters of blood. Rales were also heard in the left lung at this time.

February 17, 80,000 units of type VI antipneumococcus rabbit serum was given intramuscularly. The temperature came down

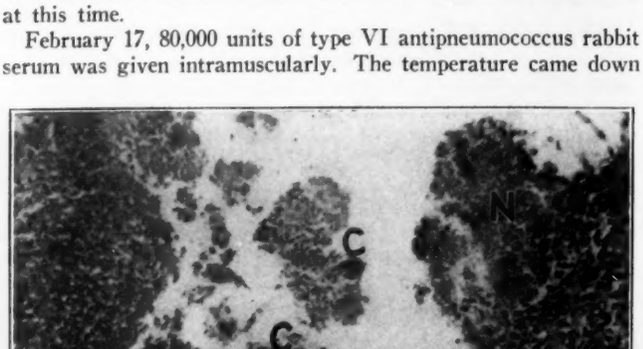

Fig. 1.—Left tonsil: Erosion of the epithelium. *N*, necrotic areas; *C*, clusters of cocci. Hematoxylin-eosin; slightly reduced from a photomicrograph with a magnification of 135 diameters.

to 100 F. within forty-eight hours and the child seemed improved.

February 21 the patient appeared pale and sulfapyridine therapy was discontinued. A total of 49 Gm. of the drug had been given in fourteen days over a period of sixteen days. The temperature was 100 F. and respirations were 40 per minute.

TABLE 3.—*Blood Counts in Case 3*

Date	Erythrocytes	Hemoglobin	Leukocytes	Neutrophils	Lymphocytes	Monocytes	Eosinophils	Therapy	Sulfanyridine in Blood
1/18	.....	..	7,000	39% = 2,730	56	4	..	Sulfap.	
1/30	3,810,000	65	7,000	48% = 3,360	50	1	1	Sulfap.	7.7
2/3	.....	..	.....	.....	..	..	..	.....	Trace
2/4	.....	65	4,200	24% = 1,008	76	..	..	Discontinued	

The signs of consolidation persisted in the right side of the chest. On the same day a blood count revealed a granulocytopenia. Liver extract, pentnucleotide and blood transfusions were given with no response. Table 1 shows the blood picture, the therapy and the condition found in a smear from bone marrow.

The patient became progressively worse. February 24 the temperature was 104 F. and respirations 40 per minute. The liver and spleen became enlarged. Physical signs and x-ray examination showed the pneumonic process to be spreading. The blood culture taken February 17 had shown no growth.

February 28 the patient was seen in consultation by Dr. Nathan Rosenthal. In view of a low red blood cell count and a diminution of the number of platelets, his diagnosis was granulocytopenia and aplastic anemia.

February 28 a few small ulcerations appeared on the left tonsil.

March 1 the temperature was 106 F. and the respirations were 50 per minute. Swabs from the pharynx and larynx showed a pneumococcus type I. The child died March 1 before further therapy could be administered. A blood culture taken on the day of death showed the presence of the type I pneumococcus.

NECROPSY [14]

The necropsy was performed three and one-half hours after death by Dr. Raymond B. Miles, assistant medical examiner, and by Dr. Vera B. Dolgopol.

The body was well developed and well nourished. The abdomen was distended. The umbilical ring was open, but there was no herniation of the intestine. No evidence of obstruction was found.

TABLE 4.—*Blood Counts in Case 4*

Date	Erythrocytes	Hemoglobin	Leukocytes	Neutrophils	Lymphocytes	Monocytes	Therapy	Sulfapyridine in Blood
1/26	3,800,000	70	10,000	53% = 5,300	47	..	Sulfap.	
1/28	.....	..	4,300	14% = 602	86	..	Sulfap.	Trace
1/30	4,780,000	80	4,300	14% = 602	80	6	Sulfap.	Trace
2/3	.....	..	.....	.....	..	..	Sulfap.	Trace
2/4	.....	65	8,250	36% = 2,970	64	..	Discontinued	

The tonsils were rather large. Two minute reddish spots were present on the left tonsil, but, aside from this small lesion, the tonsillar, pharyngeal and lingual mucous membranes were pale and showed no necrosis.

Microscopically the right tonsil was slightly congested, but showed no other evidence of inflammation. The left tonsil showed erosion of the epithelium in two areas. In one of these areas, in a crypt, there was incipient necrosis of the substance

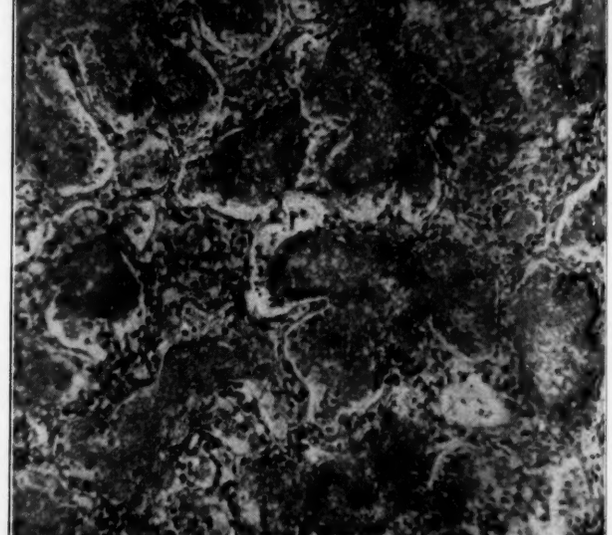

Fig. 2.—Lobar pneumonia: The exudate consists of erythrocytes, fibrin and a small number of mononuclear cells on the periphery of the alveoli. Hematoxylin-eosin; slightly reduced from a photomicrograph with a magnification of 135 diameters.

of the tonsil, with clusters of cocci and rare lymphocytes in the necrotic tissue. No polymorphonuclears were seen (fig. 1).

The larynx, trachea and bronchi presented a normal gross and microscopic appearance.

The upper lobe and a part of the middle lobe of the right lung were consolidated, purple and covered with a small amount

14. Dr. Miles gave us permission to report the pathologic examination in this case.

of fibrinous exudate. The cut surface was dull red but rather dry, with evidence of fibrin in the alveoli. The greater part of the left lower lobe was atelectatic. The rest of the tissue of both lungs was air holding.

Microscopic sections from the consolidated parts of the right lung presented a lobar consolidation of an unusual appearance. The central portions of the alveoli were filled with red blood cells and fibrin, while on the periphery, along the alveolar walls, a ring of mononuclear cells was present consisting of lymphocytes and cells of the alveolar lining (fig. 2). No polymorphonuclears were seen. Capsulated diplococci were present in the exudate of some alveoli.

The heart weighed 90 Gm. The right ventricle was distended but the myocardium was firm. The valves were intact.

Microscopic sections showed an early zenkerian degeneration. Small collections of fibroblasts, lymphocytes and plasma cells were present around small coronary branches.

The liver weighed 680 Gm. The parenchyma was quite firm; microscopically it showed albuminous degeneration.

The spleen weighed 95 Gm. and showed a marked congestion both grossly and microscopically.

The kidneys weighed 85 Gm. each. The cortex bulged slightly. Microscopically the tubular epithelium showed a moderately severe albuminous degeneration. Albuminous material was present in some Bowman's capsules. A slight infiltration with lymphocytes was present around several veins situated at the border of the cortex and medulla.

The small intestine, rectum and vagina were normal.

The bone marrow of the sternum and of a lumbar vertebra was red but could not be squeezed out for smears. The ribs contained only a minimal amount of marrow, so that the marrow spaces appeared to be empty.

Microscopic section from the bone marrow of several bones showed a slight decrease in the number of nucleated cellular elements in some areas but was not depleted as a whole (fig. 3). The cells were for the most part immature bone marrow cells, many of them with processes that held them to the stroma of the bone marrow. A small number of granular myelocytes and one or two polymorphonuclears were seen. The reticulum cells were prominent. Many normoblasts were scattered throughout the sections but they were not arranged in erythroblastic foci. The megakaryocytes were quite numerous. Many lymphocytes were present. The sinusoids were distended and contained many red blood cells and rare mononuclear cells.

Type I pneumococcus was cultured from both lungs and from the heart's blood.

CASE 2.—*Granulocytopenia.* A Negro girl aged 1 year was admitted to the Willard Parker Hospital Feb. 3, 1939, with a diagnosis of pertussis and bronchopneumonia. Breath sounds were diminished in both upper lobes of the lungs and many coarse rales were heard throughout the chest. The temperature was 103.6 F. and respirations were 60 per minute. X-ray examination revealed no consolidation at this time.

As the clinical picture was suggestive of pneumonia, sulfapyridine therapy was started February 3 with an initial dose of 2 Gm. and a maintenance dose of 2 Gm. daily. The temperature came down to 99 F. within twenty-four hours but it continued to range from 99 to 101 for the next ten days and the physical signs of pneumonia persisted until February 16. Sulfapyridine therapy was discontinued February 18, a total amount of 27 Gm. of the drug having been given during a period of fifteen days.

February 21 the patient seemed to be in good condition and convalescing satisfactorily. The chest was normal on physical examination. On the same day the blood count showed a suppression of leukocytes. Four days later there was a complete granulocytopenia. In the course of blood examinations it was found that the father and mother as well as the child had positive Wassermann reactions.

Blood transfusions, pentnucleotide and liver extract therapy was instituted February 25. Within two days the blood began to show a response. March 7 as indicated on table 2 the blood first showed a normal differential count.

During the time the infant had granulocytopenia, consolidation developed in the right upper lobe on February 24. The temperature was elevated to 102-103 F. for four days. The sputum did not reveal any pneumococcus and the blood culture was sterile. February 28 a small ulceration developed on the mucous membrane of the mouth and healed in six days. At the height of granulocytopenia the liver became enlarged and examination of the urine showed hyaline casts as well as granular casts and a few red blood cells. The urine cleared up after seven days.

X-ray examination of the bones March 13 revealed no evidence of syphilitic changes.

The patient was discharged March 17 in good condition.

CASE 3.—*Leukopenia.* A white infant girl aged 18 months was admitted to Willard Parker Hospital Jan. 18, 1939, on the fifty-first day of pertussis. On January 28 she developed

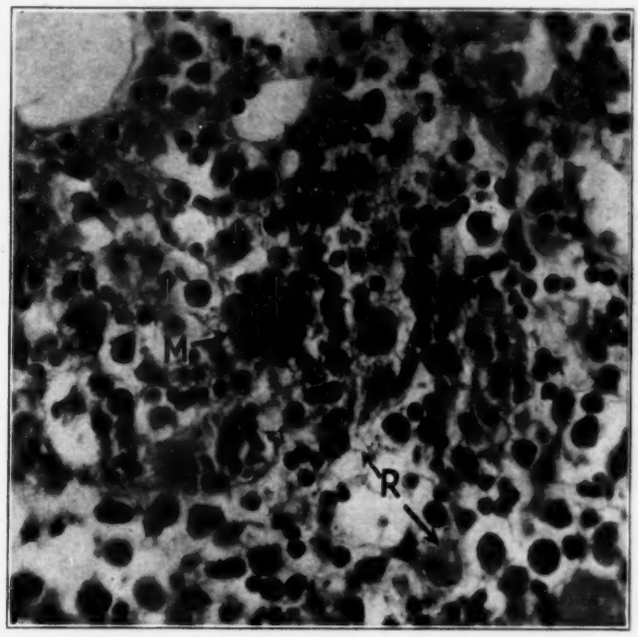

Fig. 3.—Bone marrow: Polymorphonuclears are absent. *R*, reticulum cells; *M*, megakaryocytes. Hematoxylin-eosin; slightly reduced from a photomicrograph with a magnification of 680 diameters.

a bronchopneumonia, with no pneumococcus in the sputum. Sulfapyridine therapy was started January 29 with 2 Gm. as the initial dose and 2.5 Gm. daily as a maintenance dose. January 30 the concentration of sulfapyridine in the blood was 7.7 mg. per hundred cubic centimeters. The administration of sulfapyridine was discontinued after six days because of a low white blood cell count. The total intake of sulfapyridine was 13 Gm.

The child made an uneventful recovery and was discharged February 16.

CASE 4.—A white infant girl aged 10 months was admitted to Willard Parker Hospital Jan. 25, 1939, with the diagnosis of pertussis and pneumonia. The temperature was 102 F. The physical examination revealed consolidation of the left lower lobe; these observations were confirmed roentgenologically. The sputum showed no pneumococcus.

Sulfapyridine therapy was started January 25. The initial dose was 0.5 Gm. and the maintenance dose 1.5 Gm. daily. On the fourth day of treatment, after an intake of 3 Gm., the white blood cell count showed 4,300 cells, with 14 per cent neutrophils. As the concentration of sulfapyridine in the blood was minimal, the drug was not discontinued.

Eight days later the blood picture showed an increase in the total number of white blood cells and a higher percentage of neutrophils. On the same day the temperature became normal and sulfapyridine was discontinued. The total intake of sulfapyridine was 13 Gm. in eleven days. The patient was discharged in good condition February 25.

COMMENT

It is evident from the review of the literature and from the cases presented that sulfapyridine may occasionally depress the function of the bone marrow. This effect of the drug on the bone marrow is not surprising, as sulfapyridine, or 2(para-aminobenzene sulfonamide) pyridine contains the benzamine group, which, according to Kracke and Parker,[15] is responsible for the injurious action of a number of drugs on the myelogenous tissue.

Of the five cases of granulocytopenia, three were fatal.

The action of the drug on the bone marrow apparently consists mainly in the arrest of maturation of the leukopoietic elements. The bone marrow in our case 1, while not aplastic, showed a virtual absence of polymorphonuclears, a small number of myelocytes and numerous immature cells. After patient 2 began to respond to the treatment, immature myelogenous cells appeared in the circulating blood. The erythropoietic elements, however, may also be affected, as seen in case 1, in which the number of the nucleated red blood cells in smears from the bone marrow was greatly reduced, and no erythropoietic foci were found in the sections from the bone marrow.

Several cases of a transient but definite leukopenia were mentioned by different authors, and two are presented in this report. The transient leukopenia, while not dangerous in itself, is significant, as it indicates the tendency of sulfapyridine to depress the myelogenesis in some individuals.

It is worthy of attention that the damage to the bone marrow may become manifest only after the discontinuance of the sulfapyridine therapy, as in the cases of Barnett and his associates, of Hodes and his associates (case E. J., table 1) and in our case 2. It is therefore suggested that the hematologic observations be continued for two weeks after the cessation of a prolonged sulfapyridine treatment.

It would be of practical importance to establish (1) whether the sulfapyridine is deleterious to the bone marrow when a large total amount of the drug is administered during a long course of treatment, (2) whether a high concentration of sulfapyridine in the blood plays an important role, (3) whether the drug is toxic in ordinary doses for certain sensitive individuals, (4) whether a course of sulfapyridine therapy sensitizes the patient to the drug so that it becomes injurious to the bone marrow on resumption of the therapy after an intermission, or (5) whether it is injurious only to the bone marrow already damaged by the original disease for which the treatment is given.

1. All five patients with granulocytopenia had taken large total amounts of sulfapyridine before the bone marrow was affected. Johnston's patient, an adult, had had 54 Gm. of the drug in thirteen days before the bone marrow was affected. The patient of Coxon and Forbes, also an adult, had had 54 Gm. of sulfapyridine in seventeen days before granulocytopenia was noticed. The patient of Barnett and his co-workers, a 10 year old girl, had taken 80.9 Gm. in seventeen days over a twenty-six day period. Our patients, 4 years and 1 year old, had received 49 Gm. and 27 Gm. respectively in two weeks—excessively large amounts for the size of the patients. The highest total dosage of sulfapyridine on record, administered to adults without any damage to the bone marrow, is 49.5 Gm. and 51 Gm. (Evans and Gainsford).

2. The highest concentration of sulfapyridine in the blood in our fatal case of granulocytopenia was 10 mg. per hundred cubic centimeters. Other workers, however, have observed concentrations up to 18 mg. of free sulfapyridine without deleterious results, so that a high concentration of free sulfapyridine in the blood per se is probably of less importance than a high total intake of the drug during the course of treatment.

3. An individual sensitivity to sulfapyridine probably plays a role in the development of neutropenia in some cases. Patient 4, with a leukopenia of 4,300 cells and 14 per cent neutrophils (602 neutrophils per cubic millimeter) showed this drop in the number of white cells after the intake of 3 Gm. of sulfapyridine, with only a trace of the drug in the blood at any time during the treatment. Despite the continuation of the administration of sulfapyridine, the number of white cells increased to 8,250, with 36 per cent neutrophils. In this case the absence of a severe damage to the bone marrow in a sensitive individual despite the continuation of sulfapyridine therapy could probably be explained by a rapid elimination of the drug by the kidneys. In a case of Hodes and his associates (C. K., table 2) a moderate granulocytopenia developed after only two days of treatment with 5.7 mg. of sulfapyridine per hundred cubic centimeters of blood.

4. In connection with various toxic manifestations during sulfapyridine therapy the question arose in the minds of a number of clinicians whether a course of sulfapyridine treatment might sensitize the patient, predisposing him to toxic reactions on resumption of the administration of the drug. This possibility has to be considered also in analyzing the causes of granulocytopenia in sulfapyridine therapy. Three patients with granulocytopenia had an interval of from two to three days between the two courses of sulfapyridine (patients of Johnston, Barnett and his associates and our patient 1). These cases could be considered as possible instances of toxic reactions due to sensitization to the drug. Two other patients, however (Coxon and Forbes, and our patient 2) had had a single course of treatment which presented no possibility of sensitization. The total intake of sulfapyridine in all five cases of granulocytopenia was so great that we are inclined to regard this factual evidence as a more likely cause of the damage to the bone marrow than the theoretical consideration of sensitization. The irrelevance of the second course of sulfapyridine therapy per se to the depression of the bone marrow is supported also by two observations of Hodes and his associates on patients who had had granulocytopenia during the first course of the therapy but showed no recurrence of that manifestation during the second course.

5. Johnston in his case could not exclude the possible damage to the bone marrow by the overwhelmingly active streptococcic infection, in addition to the large amount of sulfapyridine administered. Coxon and Forbes, while realizing that the drug was probably responsible for granulocytopenia, considered that the original disease, typhoid, might have made the bone marrow more susceptible to sulfapyridine. The patient of Barnett and his associates was apparently over her original infection at the time granulocytopenia developed. In our cases it is unlikely that pertussis had any influence on the depression of the function of the bone marrow. While it is true that in pertussis the percentage of neutrophils is often markedly reduced, there is usually no actual neutropenia, as the total number of white blood cells is high. The absolute number of

15. Kracke, R. R., and Parker, F. P.: Etiology of Granulopenia (Agranulocytosis), J. Lab. & Clin. Med. **19**: 799, 1934.

neutrophils in pertussis, despite the low percentage, may even rise above the normal figures.[16] In our case 2 the roentgenologic study failed to show any involvement of the bones. The rapid response to the therapy indicates that the bone marrow in all probability was essentially normal. However, the possibility that her bone marrow was to some extent damaged by the congenital syphilis cannot be denied. It would seem that in at least two cases of granulocytopenia (Barnett and his associates and our case 1) the excessively large total intake of sulfapyridine alone was responsible for the condition. In two cases there was possibly a joint damaging action on the bone marrow by the drug and by the original infection, and in one case congenital syphilis could have been a predisposing factor. Pertussis can probably be excluded from contributing to the depression of the myelogenous elements.

It is apparent from perusing the literature on sulfapyridine therapy, and particularly in reference to the high dosage of the drug administered in the cases of granulocytopenia, that there is a tendency to use excessively large amounts of sulfapyridine. While trying to accomplish a high initial concentration level of sulfapyridine in the blood, as recommended by Whitby, his further suggestion to keep the blood level at 8 mg. per hundred cubic centimeters and to use 23 Gm. of the drug per week for an adult is sometimes overlooked.

SUMMARY

A review of the recent literature shows that three cases of granulocytopenia and a number of cases of leukopenia were observed in the course of sulfapyridine therapy.

Two new cases of granulocytopenia and two cases of leukopenia are reported in children with pertussis and pneumonia treated with sulfapyridine.

In the fatal case of granulocytopenia reported here, the patient lived nine days following a complete disappearance of polymorphonuclears. Minimal tonsillar lesions appeared two days before the patient died of lobar pneumonia. The pneumonic exudate was free of polymorphonuclear cells. The bone marrow was immature. Aplastic anemia developed in the course of granulocytopenia but the megakaryocytes remained intact.

In the second case of granulocytopenia immature cells of the myeloid group appeared in the circulating blood with the beginning of recovery and were gradually replaced by more mature forms.

All five patients with granulocytopenia received large total amounts of sulfapyridine during the course of treatment.

In at least two cases of granulocytopenia sulfapyridine was apparently the only cause of the condition. In the other three cases a coincident damage to the bone marrow by the original infection or by a previous infection may be considered to be a contributary factor in the development of granulocytopenia.

In two cases granulocytopenia developed after the discontinuance of the sulfapyridine therapy.

CONCLUSIONS

A high total intake of sulfapyridine may cause granulocytopenia.

The damage to the bone marrow consists in depression of maturation of myeloid cells. The erythropoiesis may also be occasionally disturbed.

Blood counts should be made twice a week during sulfapyridine therapy and continued for two weeks after the withdrawal of the drug.

ADDENDUM.—Since the paper was submitted for publication, another case of leukopenia during sulfapyridine therapy was observed at this hospital, in a 16 month old male infant suffering from pneumococcic pneumonia type XIV. On admission the blood count showed 10,000 white cells per cubic millimeter of blood, with 76 per cent, or 7,600, neutrophils. The child received 7 Gm. of sulfapyridine in four days; the drug was discontinued because of leukopenia (4,200 white blood cells per cubic millimeter, with 25 per cent, or 1,050, neutrophils). Eight days later the white cell count rose to 21,700 per cubic millimeter of blood, with 71 per cent, or 15,107, neutrophils. The administration of the drug was resumed, and the child received another 7 Gm. in three days. The white cell count went down to 8,500 per cubic millimeter of blood, with 42 per cent, or 3,500, neutrophils, and the drug was withdrawn. The patient made an uneventful recovery.

16. Dolgopol, Vera B.: The Blood Picture in the Early Stages of Pertussis, J. Pediat. **3**: 367, 1933.

THE TREATMENT OF AURICULAR FIBRILLATION WITH QUINIDINE AND STRYCHNINE

REPORT OF FORTY-ONE CASES

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There continues to be considerable variance of opinion regarding the advisability of attempting to restore normal cardiac rhythm by the administration of quinidine in cases of auricular fibrillation. The greatest variance of opinion concerns the type of case in which this should be attempted, the amount of permanent benefit, the size of the dose and the method of administration.

PHYSIOLOGIC ACTION OF QUINIDINE

Quinidine is an alkaloid of cinchona and is isomeric with quinine.[1] It is soluble in ninety parts of water and in ten parts of alcohol. It is readily absorbed from the upper portion of the intestinal tract. When given intravenously to animals, it disappears from the blood stream in about five minutes. It is eliminated chiefly by the kidneys.

Weiss and Hatcher[2] found that when quinidine is administered to cats it is almost entirely eliminated in from three to four hours. We found a small trace of the drug in the urine of human beings one hour after the oral administration of 5 grains (0.3 Gm.); the maximal amount was found from two to three hours after administration and only a trace was found at the end of four hours. The drug is supposed to be partially destroyed by the liver.

Most of the investigators who studied the action of the drug on animals and anesthetized the animals found that the sinus rate was slowed, the PR interval was prolonged and the intraventricular conduction was delayed. Some of these investigators found that the refractory

From the Section on Cardiology, the Mayo Clinic.
Read before the Section on Pharmacology and Therapeutics at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Bastedo, W. A.: Materia Medica, Pharmacology and Therapeutics, ed. 4, Philadelphia, W. B. Saunders Company, 1937.
2. Weiss, Soma, and Hatcher, R. A.: Studies on Quinidine, J. Pharmacol. & Exper. Therap. **30**: 335-345 (Feb.) 1927.

period was lengthened. The investigators [3] who did not anesthetize the animals did not obtain these results. They found that the sinus rate was accelerated and that there was no prolongation of the PR interval. They did find, however, that the intraventricular conduction was delayed. We do not know a good explanation for the difference in the results obtained by these two groups of investigators unless the absence of anesthesia and the production of pain played an important role.

SYNERGY OF QUINIDINE AND STRYCHNINE SULFATE

It is our impression that quinidine and strychnine sulfate are synergists. We believe that quinidine is more efficacious if supplemented with strychnine sulfate than it is when administered alone and that smaller doses of quinidine are required if strychnine sulfate is also administered. We obtained this impression a few years ago while we were treating several patients who had auricular flutter. In three cases in which administration of quinidine for from ten to fourteen days did not have any appreciable effect on the auricular flutter, normal cardiac rhythm was reestablished by the administration of strychnine sulfate in addition to the quinidine. Two doses of strychnine sulfate were administered in one of the cases and three doses were administered in two of the cases. We do not have any other pharmacologic proof of this synergy.

MATERIAL

This paper is based on the results obtained in forty-one cases of auricular fibrillation. With one or two exceptions, these were consecutive cases of auricular fibrillation that were observed at the Mayo Clinic. The age of the patients varied from 20 to 76 years. Of the forty-one patients, one was in the third, five were in the fourth, nine were in the fifth, sixteen were in the sixth, nine were in the seventh and one was in the eighth decade of life. Thirty of the patients were men and eleven were women.

ETIOLOGY

The auricular fibrillation was classified as idiopathic in four cases; that is, it was the only evidence of organic heart disease. In five cases the fibrillation was the result of hyperthyroidism; two of the patients also had hypertension and coronary sclerosis. There were six cases in which the auricular fibrillation was associated with hypertension and coronary sclerosis. In twelve cases it was due to rheumatic heart disease and in fourteen cases it was the result of coronary sclerosis.

STATE OF COMPENSATION

The compensation was good in twenty-five cases but a varying degree of congestive heart failure was present in sixteen cases. In twelve of the sixteen cases the heart failure was mild and in four cases it was severe.

DURATION OF AURICULAR FIBRILLATION

In most cases it is difficult to determine the time of onset of the auricular fibrillation. As far as could be determined, the time that had elapsed between the onset of the auricular fibrillation and the institution of treatment was one week in two cases, six weeks in four cases, from two to three months in seven cases, four months in four cases, six months in two cases, seven months in one case, ten months in one case, one year in seven cases, two years in five cases, three years in three cases, five years in two cases, seven years in one case, eight years in one case and ten years in one case. While these figures are not strictly accurate, we are reasonably certain that the auricular fibrillation had at least been present for the indicated time. It is rather interesting to note that the patient who had had auricular fibrillation for ten years had consulted the late Dr. Joe Miller at the time of the apparent onset of the fibrillation. At that time quinidine had been prescribed in small doses but normal cardiac rhythm had not been established.

AMOUNT OF QUINIDINE ADMINISTRATION

In most cases 5 grains (0.3 Gm.) of quinidine was administered every three hours and $\frac{1}{40}$ or $\frac{1}{30}$ grain (0.0016 or 0.0022 Gm.) of strychnine sulfate was administered three times a day, depending on the weight of the patient. The total amount of quinidine that was administered before normal cardiac rhythm was established was 10 grains (0.65 Gm.) in one case, 15 grains (1 Gm.) in three cases, 20 grains (1.3 Gm.) in six cases, 30 grains (2 Gm.) in eight cases, 40 grains (2.6 Gm.) in seven cases, 50 grains (3.3 Gm.) in three cases, 60 grains (4 Gm.) in four cases, 90 grains (6 Gm.) in one case, 100 grains (6.6 Gm.) in two cases, 120 grains (8 Gm.) in one case, 130 grains (8.65 Gm.) in one case, 165 grains (11 Gm.) in one case, 190 grains (12.6 Gm.) in one case, 200 grains (13.2 Gm.) in one case and 2,620 grains (175 Gm.) in one case.

In thirty-one, or 75.6 per cent, of the cases the amount of quinidine required to restore normal cardiac rhythm was 60 grains (4 Gm.) or less. In eight cases from 90 to 200 grains (6 to 13.2 Gm.), or an average of 124 grains (8.24 Gm.), was required. As previously stated, 2,620 grains (175 Gm.) was required in one case. This patient was a man who had rheumatic endocarditis and mitral stenosis. His left leg had been amputated because of acute occlusion of the femoral artery. Auricular fibrillation had been present continuously for seven years before the patient came to the clinic. A total of 135 grains (9 Gm.) of quinidine was administered in five days. During this period $\frac{1}{40}$ grain (0.0016 Gm.) of strychnine sulfate was administered three times a day. Auricular flutter developed on the fifth day and persisted for sixty-six days. The patient took a total of 2,620 grains (175 Gm.) of quinidine, or an average of about 40 grains (2.6 Gm.) a day, before normal

3. The investigations were reported by:
Boden, E., and Neukirch, P.: Klinische und experimentelle Beobachtungen über die Herzwirkung des Chinidins, Deutsches Arch. f. klin. Med. **136:** 181-191, 1921.
Carter, J. B., and Traut, E. F.: Quinidine and Strychnine in Treatment of Premature Contractions, Am. J. M. Sc. **189:** 206-215 (Feb.) 1935.
Cohn, A. E.; Fraser, F. R., and Jamieson, R. A.: The Influence of Digitalis on the T Wave of the Human Electrocardiogram, J. Exper. Med. **21:** 593-604, 1915.
Cohn, A. E., and Levy, R. L.: Experimental Studies of the Pharmacology of Quinidine, Proc. Soc. Exper. Biol. & Med. **18:** 283-284, 1920-1921.
Cohn, A. E., and Levy, R. L.: Experiments with Quinidine on Conduction and on the Refractory Period in the Dog's Heart, ibid. **19:** 174-179, 1921-1922.
Drury, A. N.; Horsfall, W. N., and Munly, W. C.: Observations Relating to the Action of Quinidine upon the Dog's Heart: The Refractory Period of, and Conduction in, Ventricular Muscle, Heart **9:** 365-374 (Dec.) 1922.
Gold, Harry, and Modell, Walter: The Action of Quinidine on the Heart in the Normal Unanesthetized Dog, J. Pharmacol. & Exper. Therap. **46:** 357-374 (Nov.) 1932.
Gold, Harry; Modell, Walter, and Price, Leo: Combined Actions of Quinidine and Digitalis on the Heart, Arch. Int. Med. **50:** 766-796 (Nov.) 1932.
Gordon, Burgess; Matton, Marcel, and Levine, S. A.: The Mechanism of Death from Quinidine and Method of Resuscitation: An Experimental Study, J. Clin. Investigation **1:** 497-517 (Aug.) 1925.
Jackson, D. E.; Friedlander, Alfred, and Lawrence, J. V.: An Experimental Investigation of the Pharmacological Action of Quinidine, J. Lab. & Clin. Med. **7:** 311-339 (March) 1922.
Korns, H. M.: Experimental and Clinical Study of Quinidine Sulfate: Experimental, Arch. Int. Med. **31:** 15-35 (Jan.) 1923.
Levy, R. L.: Clinical Studies of Quinidine: IV. The Clinical Toxicology of Quinidine, J. A. M. A. **79:** 1108-1113 (Sept. 30) 1922.
Lewis, Thomas; Drury, A. N.; Iliescu, C. C., and Wedd, A. M.: Action of Quinidine upon the Dog's Heart, with Special Reference to Its Action on Clinical Fibrillation of Auricles, Heart **9:** 55-85 (Dec.) 1921.

cardiac rhythm was established. The dose of quinidine was then reduced to 5 grains (0.3 Gm.), which was administered four times a day for a few days and then was administered three times a day. When the patient was examined one year after his dismissal it was found that the cardiac rhythm was still normal.

ONSET OF AURICULAR FLUTTER

In cases of auricular fibrillation it is relatively common for auricular flutter to develop while quinidine is being administered. In a review of the literature Warren[4] found that auricular flutter developed in thirty-nine, or 14.8 per cent, of 263 cases of auricular fibrillation in which quinidine was administered.[5] Once auricular flutter develops, it may continue permanently, it may revert to auricular fibrillation, or normal cardiac rhythm may return.

Auricular flutter developed in four, or 9.7 per cent, of the cases in this series. In one case it developed after the administration of 20 grains (1.3 Gm.) of quinidine, in two cases it developed after the administration of 65 grains (4.3 Gm.) and in one case it developed after the administration of 135 grains (9 Gm.). In one case the flutter lasted for sixty-six days before normal cardiac rhythm returned, in one case the flutter persisted permanently and in two cases it reverted to auricular fibrillation.

ILL EFFECTS OF QUINIDINE

Toxic Effects.—Nausea, vomiting, diarrhea, weakness and palpitation developed in four, or 9.7 per cent, of the cases in this series. In two of these cases the symptoms were mild but in two cases they were fairly severe. In the four cases the symptoms of toxemia developed after the administration of 40 grains (2.6 Gm.), 45 grains (3 Gm.), 65 grains (4.3 Gm.) and 210 grains (14 Gm.) respectively. In all these cases the administration of quinidine was discontinued at the onset of symptoms of toxemia.

Embolism.—Cerebral embolism did not occur while the patients were being treated or while they were under observation at the clinic. In three cases there was a history of cerebral embolism and hemiplegia. One of these patients had had a stroke two years before treatment was instituted and rather complete hemiplegia was still present when she came to the clinic. Another patient had had a stroke three months prior to the beginning of treatment. In the third case the treatment was started immediately after the development of hemiplegia; in this case normal cardiac rhythm was established and maintained by administration of a minimal amount of quinidine.

Peripheral Arterial Occlusion.—In no case did arterial occlusion occur while the patient was being treated. In three cases arterial occlusion had occurred before the treatment was begun. In one of these cases occlusion of the femoral artery had necessitated amputation of the right leg three years before the patient came to the clinic. Another patient had had acute occlusion of the femoral artery which had necessitated amputation of the left leg below the knee. In the third case, in which the auricular fibrillation was associated with mitral stenosis, the treatment was started immediately after the occurrence of acute occlusion of both popliteal arteries; in this case, normal cardiac rhythm was established and maintained.

Sudden Death.—Sudden death occurred in three cases. One of these patients was a woman aged 45 who had chronic rheumatic endocarditis, myocardial insufficiency and a considerable degree of cardiac enlargement. Auricular fibrillation had been present for about six weeks. In addition, the patient had a huge hypernephroma on the left side. We were asked to see her and to evaluate the surgical risk involved. It was thought advisable to attempt to establish normal cardiac rhythm. Five grains (0.3 Gm.) of quinidine was administered every hour until three doses had been given. On the following morning, that is, on the second day of treatment, the cardiac rhythm was normal. On this day, four doses of 5 grains (0.3 Gm.) each of quinidine were administered. On the morning of the third day the patient felt very well when she awoke. About 10 a. m., after she had eaten breakfast and while she was sitting and talking to members of her family, she ceased talking and died very suddenly; that is, within a minute or two. A necropsy was not performed in this case.

The second patient who died suddenly was a man aged 57 who had an adenomatous goiter, hyperthyroidism and auricular fibrillation. He probably had had a previous hypertension. The auricular fibrillation had been present continuously for six months before he came to the clinic. Examination disclosed cardiac enlargement, grade 3. The auricular fibrillation continued after a thyroidectomy was performed. On the seventh day after operation a total of 15 grains (1 Gm.) of quinidine was administered. This was administered in doses of 5 grains (0.3 Gm.) and at intervals of three hours. On the morning of the eighth day after operation his cardiac rhythm was regular. On this day 5 grains (0.3 Gm.) of quinidine was administered every four hours until four doses had been given, and one dose of $\frac{1}{30}$ grain (0.0022 Gm.) of strychnine sulfate was administered. Auricular fibrillation was present on the following morning; that is, on the morning of the ninth day after the operation. On this day a total of 20 grains (1.3 Gm.) of quinidine was administered in doses of 5 grains (0.3 Gm.) and at intervals of three hours, and three doses of $\frac{1}{30}$ grain each (0.0022 Gm.) of strychnine sulfate were administered. The cardiac rhythm was regular on the morning of the tenth day after operation. That night the patient seemed to be somewhat restless. He went to the bathroom several times and during most of the night he slept in a chair. When his wife arose and shook him to awaken him because he was snoring loudly he died suddenly. He just slumped down in the chair and was dead. Necropsy disclosed that his heart was enlarged and dilated. The heart weighed 650 Gm. The coronary arteries were moderately sclerosed. No clots were found in the auricles or ventricles.

The third patient who died suddenly was a man aged 53 who had hypertension, coronary sclerosis, auricular fibrillation and cardiac hypertrophy. Auricular fibrillation probably had been present for several weeks before the patient came to the clinic. He had a moderate degree of congestive heart failure and was admitted to

4. Warren, W.: Auricular Flutter During the Treatment of Auricular Fibrillation by Quinidine Sulfate, St. Bartholomew's Hosp. Rep. **69**: 291-307, 1936.

5. Reported by:
Clark-Kennedy, A. E.: Quinidine in the Treatment of Auricular Fibrillation, Quart. J. Med. **16**: 204-235 (April) 1923.
Hay, John: Quinidine Sulfate in Cardiac Disease, ibid. **15**: 313-318 (July) 1922.
Parkinson, John, and Nicholl, J. W. McK.: Quinidine in Auricular Disease: Paroxysmal and Established, Lancet **2**: 1267-1270 (Dec. 16) 1922.
Bramwell, J. C., and Ellis, Reginald: The Ultimate Results of Quinidine Therapy in Auricular Fibrillation, ibid. **2**: 960-966 (Nov. 10) 1928.
Drury, A. N., and Iliescu, C. C.: The Restoration of the Normal Cardiac Mechanism in Cases of Auricular Fibrillation by Means of Quinidine Sulfate, Brit. M. J. **2**: 511-514 (Oct. 1) 1921.
Burwell, C. S., and Dieuaide, F. R.: Clinical Experience with Quinidine, Arch. Int. Med. **31**: 518-526 (April) 1923.
Parkinson and Campbell.[6]
Viko, Marvin and White.[6]

the hospital. During the first five days that the patient was in the hospital he received 1½ grains (0.1 Gm.) of digitalis three times a day. The administration of quinidine was started on the sixth day. On this day he received five doses of 5 grains (0.3 Gm.) each at intervals of three hours. Another dose of 5 grains (0.3 Gm.) of quinidine was administered on the morning of the seventh day. At about 8 a. m. his cardiac rhythm was normal. We saw the patient while we were making ward rounds with several physicians. He said that he felt unusually well. He was not dyspneic and he appeared perfectly comfortable. A few minutes later, while his wife and son were talking with him as he sat in bed leaning against a back rest, he ceased talking, slumped down in bed and died without any struggle. The postmortem appearances were similar to those in the previous case. The heart was greatly enlarged and dilated. Necropsy disclosed coronary sclerosis, grade 2, but there was no evidence of acute coronary occlusion. No clots were found in any of the chambers of the heart.

ANALYSIS OF RESULTS

In the past it has been believed that the production of embolism by the detachment of a clot was the real danger and the cause of death in cases in which quinidine was administered. In this series of forty-one cases, embolism did not occur while the patients were being treated or while they were under observation at the clinic. In the past the possibility of embolism has been the chief objection to the administration of quinidine. Some investigators [6] have observed that the occurrence of embolism is not any more common in cases of heart disease in which quinidine is administered than it is in cases in which quinidine is not administered. We feel certain that this objection has been greatly overemphasized.

There were three sudden deaths in this series of cases. This is not a particularly high mortality rate in forty-one cases of rather severe heart disease. The mortality will vary greatly in different series of cases, as it depends on the severity of the heart disease present. It is a very high rate for this particular type of death. Very sudden death is a rare occurrence in any group of cases. By sudden death we mean death that occurs within a few seconds to one or two minutes. A certain percentage of patients who have pulmonary embolism will die suddenly. Patients with acute coronary occlusion as a rule do not die so quickly; they live, as a rule, several minutes—from ten to twenty minutes or an hour or longer.

Patients with cerebral vascular accidents usually live a few hours or longer. It is rather interesting to speculate on the mechanism of death in the cases in which the patients died very suddenly. We believe that it is probable that both the sino-auricular node and the auriculoventricular node became depressed for a sufficient period of time to produce death. In other words, we believe that the patients actually died of cardiac standstill. In each instance in which sudden death occurred, normal rhythm was restored before death occurred. In the three cases the hearts were rather markedly enlarged. In one case auricular fibrillation had been present for six weeks, in one case it had been present for six months and in the third case it had been present for one year. The amount of quinidine did not appear to be an important factor, as one patient received a total of 35 grains (2.3 Gm.) in two days, one a total of 55 grains (3.6 Gm.) over a period of three days and one a total of 30 grains (2 Gm.) over a period of twenty-four hours.

Normal cardiac rhythm was reestablished or restored in thirty-three, or 80.4 per cent, of the forty-one cases. There were eight cases in which normal rhythm could not be reestablished or restored. Five of these eight patients had rheumatic heart disease. Three of the eight patients had hypertensive and arteriosclerotic heart disease. The percentage of cases in which different investigators have been able to establish normal cardiac rhythm has varied considerably. We think this depends largely on the type of patients that are selected for treatment. We are reasonably certain that if one could select his patients with sufficient care normal cardiac rhythm could be restored in almost 100 per cent of cases. Normal rhythm has persisted in this group of cases for varying lengths of time. In some cases it has persisted for two years and in a few cases it has persisted for four months. The average length of time has been approximately six months. Sufficient time has not elapsed since this study has been completed to warrant definite conclusions with regard to the permanence of the reestablished normal rhythm. However, there have been several authors who have observed their patients for a considerable number of years. Campbell and Gordon [7] were able to establish normal cardiac rhythm in 64 per cent of 135 cases. In 34 per cent of these cases normal rhythm had been maintained for an average period of nearly four years and in 25 per cent of the cases it has been maintained for nine years. For a few days after normal rhythm was established, the patients usually received the same dose of quinidine that was administered previously. A few of the patients had short temporary relapses, but normal rhythm was readily restored by administration of the same doses of quinidine that had been given previously.

TYPE OF PATIENT WHO SHOULD RECEIVE QUINIDINE

It is, we believe, well established that hearts in which there is normal rhythm are more efficient than those in which there is auricular fibrillation, provided other factors are equal.[8] The prognosis of auricular fibrillation depends solely on the severity of the associated cardiac damage. It is a well known fact that patients who have mild cardiac disease and permanent auricular fibrillation may live for years and follow a rather active normal life. This fact should be borne in mind when selecting patients who should be treated.

It seems to us that quinidine is especially indicated when the patients are young persons who have idiopathic auricular fibrillation but who do not have any other evidence of heart disease. The next group of patients who should receive quinidine are those who have a minimal amount of heart disease and who have had auricular fibrillation only a short time. Quinidine should be administered in cases in which auricular fibrillation is due to hyperthyroidism, is not associated with any significant evidence of organic heart disease and continues several weeks after thyroidectomy has been performed. Patients for whom the least amount of the

6. Parkinson, John, and Campbell, Maurice: The Quinidine Treatment of Auricular Fibrillation, Quart. J. Med. **22**: 281-303 (Jan.) 1929. Viko, L. E.; Marvin, H. M., and White, P. D.: A Clinical Report on the Use of Quinidine Sulfate, Arch. Int. Med. **31**: 345-363 (March) 1923.

7. Campbell, Maurice, and Gordon, F. W.: The Quinidine Treatment of Auricular Fibrillation, Quart. J. Med. **5**: 205-226 (April) 1936. Weisman, S. A.: The Ambulatory Treatment of Auricular Fibrillation with Quinidine: A Five Year Follow-Up Study, Minnesota Med. **19**: 349-352 (June) 1936.

8. Reynolds, Chapman, and Blackberg, S. N.: Cardiac Output as Influenced by Ephedrine, Homocamfin, Quinidine, Quinine, Chloral and Chloroform, Proc. Soc. Exper. Biol. & Med. **24**: 870-872 (June) 1927. Smith, W. C.; Walker, G. L., and Alt, H. L.: The Cardiac Output in Heart Disease: I. Complete Heart Block, Auricular Fibrillation Before and After the Restoration to Normal Rhythm; Subacute Rheumatic Fever and Chronic Rheumatic Valvular Disease, Arch. Int. Med. **45**: 706-726 (May) 1930.

drug is required to establish normal cardiac rhythm are those who are about 55 or 60 years of age, have a moderate degree of coronary sclerosis, have a good degree of cardiac compensation and have had auricular fibrillation for a relatively short time. In most instances of this type, only a few doses of quinidine are required to restore normal rhythm and in a large percentage of cases normal rhythm can be maintained for many years. We believe that patients for whom it is most dangerous to administer quinidine are those who are elderly, who have rather serious hypertension and coronary sclerosis, with rather marked cardiac enlargement, and who have had auricular fibrillation for a long time. It probably is not advisable to attempt to establish normal rhythm with quinidine in any case of severe congestive heart failure. There is a group, however, which we believe is an exception to this statement. In this group the patients have considerable heart disease with varying amounts of heart failure and emboli continue to form. These emboli may be cerebral, pulmonary or may occur in the peripheral vessels. In this group of cases we believe that one is justified in taking a greater risk to establish normal rhythm. The patients are less likely to have emboli if normal rhythm can be restored. We believe that the possibility of clots being detached as emboli when the auricles resume their normal rhythm has been greatly overemphasized. We believe that the greatest danger in giving quinidine is the possible occurrence of sudden death. This danger has to be seriously considered and weighed against the benefit that the patient receives when normal cardiac rhythm is reestablished. In well selected cases, we believe that there is ample proof that this danger is slight. Patients whose normal rhythm is restored and maintained undoubtedly are greatly benefited.

ABSTRACT OF DISCUSSION

DR. ROY W. SCOTT, Cleveland: The authors' observations on the effect of quinidine in restoring a sinus rhythm in cases of auricular fibrillation agree in general with those previously recorded. The early enthusiasm accorded quinidine has been tempered by the fact that the drug is not devoid of danger and, as the authors observed in their fatal cases, death often occurs suddenly of patients who exhibit no evidence of congestive failure. To avoid such accidents, care should be exercised in the selection of patients to receive quinidine and, before giving the drug to the patient with auricular fibrillation, it should be remembered that many patients do very well and survive for many years on a maintenance dose of digitalis. It seems fair to say that, the more damaged the heart, the more unsatisfactory are the results obtained with quinidine. Death may occur suddenly; the patient may fail to respond, or the restored sinus rhythm may persist for only a short time. I have found, as the authors have indicated, that the best results are seen in those cases in which fibrillation is not associated with any demonstrable evidence of organic heart disease. Good results are also seen in patients with hyperthyroidism who continue to fibrillate after thyroidectomy; if such patients are cured by operation, a sinus rhythm usually persists. Patients with rheumatic heart disease and mitral stenosis who are known to have had fibrillation only a short time and who have not had an attack of congestive failure usually respond satisfactorily to quinidine. Sooner or later, however, fibrillation reappears and it becomes increasingly difficult to establish a sinus rhythm which persists for any length of time. That quinidine is a valuable drug in the management of carefully selected cases of auricular fibrillation is well established but, as McKenzie predicted many years ago, digitalis remains the most reliable drug in the majority of cases of fibrillation associated with seriously damaged hearts.

DR. F. J. HIRSCHBOECK, Duluth, Minn.: One of the important points the authors raised relative to the treatment of fibrillation was the question of the incidence of embolic deaths. No one probably has had a very great experience in sudden death with the use of quinidine, because, if he had, he probably would discontinue its use. Obviously, much of what we have in the form of data devolves on records in the literature. I do not believe that pulmonary emboli are likely to be the cause of sudden death, because usually emboli that emanate from the heart are not of the large type that tend to cause rapid dissolution. Peripheral emboli, likewise, rarely cause sudden death. The only possibility to consider in an embolic death would be that of cerebral origin. If that were a common cause, our postmortem statistics should show it definitely. If deaths in these cases are not of embolic origin (and I do not believe all of them, or possibly even the great majority of them are), they probably occur from some physiologic disturbance in the conduction mechanism in the heart, as has been indicated by the authors in their discussion of animal experimentation. Deaths occur particularly in cases of severe heart disease with chronic fibrillation. It is in this type of heart that quinidine is likely to be used for a long time and in rather large doses. So one tends to foster and favor the possibility of a sudden physiologic disturbance. The use of strychnine as a synergist with quinidine brings up two questions. If embolic deaths are common, and if they are the usual source of death, we must be careful in using a synergist like strychnine, because it may give us a false sense of security in that we may be able to use smaller doses of quinidine, bring about a normal rhythm in cases of more serious fibrillation and tend to favor more embolic deaths rather than less. If strychnine acts as a syngerist on a pharmacologic basis with quinidine, we must find out by further use whether it is a physiologic synergist or an antagonist. One must think of that when one realizes that the authors reported three fatalities in forty-five cases.

DR. MORRIS MARGOLIN, Omaha: What is the status of digitalis in the treatment of auricular fibrillation? What do you think of slowing the heart rate first with digitalis and then giving quinidine? Would you use quinidine and digitalis simultaneously?

DR. S. A. WEISMAN, Minneapolis: We have been interested in quinidine in the treatment of auricular fibrillation at the University of Minnesota for nine years and our results have been quite satisfactory. The question of the dangers of quinidine causing emboli and sudden deaths is being constantly brought up. In 1923 Viko, Marvin and White reported 484 cases of auricular fibrillation treated with quinidine that they had collected from the literature and compared that group with 200 cases not treated with quinidine that they had collected from the records of the Massachusetts General Hospital. They found that there was little difference in the number of accidents in the two groups. In 1922 Robert Levy reported fifty cases of auricular fibrillation, twenty-five treated with quinidine and twenty-five treated in the usual manner. He had five accidents in the group not treated with quinidine and one possible embolus in the quinidine-treated group. Many deaths attributed to quinidine are not due to quinidine at all. A woman aged 26, who had a mitral stenosis and auricular fibrillation and who was decompensated, was given digitalis and later quinidine. While on this treatment she died suddenly. Shortly before her death her heart was fibrillating. The postmortem disclosed a large vegetation on the aortic valve and subacute bacterial endocarditis. The patient, however, had had no abnormal elevation of temperature or other definite signs that would lead one to suspect this diagnosis. A portion of the vegetation on the valve had broken off into the circulation and caused cerebral embolism and sudden death. Should a patient die while being treated with quinidine, the death is usually attributed to the use of this drug. But in many cases no emboli or thrombi are found. The cause of death is often undetermined. Mackenzie, Orr and White reported similar cases of asystole due to digitalis. I can't say that quinidine is not at all dangerous, but one must be wary of concluding that every accident that occurs while a patient is being treated with quinidine is due to that drug. With regard to the difference in efficiency between a fibrillating and a regular heart, brought out by the authors, Dr. Kirkoff at the University of Minnesota made a study of several patients with mitral stenosis and fibrillation. These patients were first digitalized until the heart rate was reduced to between 70 and 60 per minute, and cardiac output determinations were made on each patient. The

patients were then given quinidine and, after their hearts were restored to regular rhythm, cardiac output determinations were again made. The average increase in cardiac output was about 30 per cent.

DR. H. L. SMITH, Rochester, Minn.: In answering Dr. Scott's question, we meant to convey the impression that, from our experience, the administration of strychnine with quinidine renders the quinidine more effective although we have no pharmacologic proof of this belief. Dr. Margolin asked "What effect, if any, does digitalis have on patients with auricular fibrillation?" We can state that in our experience digitalis rarely, if ever, has restored normal cardiac rhythm. However, digitalis does slow the auricular rate in cases of auricular fibrillation, an effect that is very desirable. We believe that digitalis is our best cardiac medicine and we would not for a minute advise or recommend the universal substitution of quinidine for digitalis. "Is it advisable to digitalize the patient before quinidine is given?" In our experience it is not necessary to digitalize the patient before the administration of quinidine. Normal rhythm can be restored just as quickly without the use of digitalis as with it. In regard to the causes of sudden death, we agree with Dr. Weisman that the possibility of clots being detached as emboli, when the auricles assume their normal rhythm, has been greatly overemphasized. We believe that the greatest danger in giving quinidine is the occurrence of sudden death, which is probably due to depression of both the sino-auricular and auriculoventricular nodes for a sufficiently long period to produce death. In other words, the immediate cause of the death in such cases is cardiac standstill.

Clinical Notes, Suggestions and New Instruments

COLLAPSE WITH DEATH FOLLOWING THE USE OF AMPHETAMINE SULFATE

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Coroner, Tippecanoe County

During the past few years the use of amphetamine sulfate as a stimulating drug has become increasingly widespread. Severe collapse following its use has been reported, but to my knowledge no fatalities have been registered in the medical literature. The public is becoming familiar with it, and its use among students is probably more common than one would think. The following case should serve to emphasize the repeated warnings against its use in fatigue states:

REPORT OF CASE

E. J. S., a white man aged 25, while writing an examination at Purdue University Jan. 24, 1939, suddenly began to snore loudly. The professor in charge rushed to his side and with the help of several students laid him on the floor, where he continued to snore and make "funny noises" for a few minutes and then ceased to breathe. Dr. O. R. Wilson of the Purdue Health Service was called and went immediately to the classroom. The patient was apparently dead on his arrival, but Dr. Wilson in the hope of reviving him administered caffeine with sodium benzoate and epinephrine and started artificial respiration. This was continued for one hour with no other result than the expression of some gastric contents.

An autopsy was performed four and one-half hours after death by Dr. Frank P. Hunter. A complete transcript of the autopsy is given here because the conditions found are quite interesting.

The body was estimated to weigh 165 pounds (75 Kg.) and was 5 feet 8 inches (173 cm.) tall; there were good nutrition, no external markings and very little rigor.

The viscera and kidneys appeared normal except for marked epiploic congestion. The liver was very tense, smooth, blue and congested. The gastric mucosa showed marked congestion with no denuded areas. The contents consisted of food débris and bloody mucus. The stomach was markedly dilated.

The pleural cavity was slightly dry. The lungs were free except for old fibrous bands posterior to the left side. The lungs and bronchi appeared normal. The mediastinal area was normal and the pericardial fluid was normal. The heart wall was injected, the right auricle being dilated four times its normal size. There were two thickened muscle areas anterior to the right ventricle. The coronaries were well defined. The heart valves were normal. There was no aneurysm of the aorta or other vessels.

Blood showed a dark fluid state throughout the body. There was very little coagulum in the heart only.

The skull was normal. The meningeal vessels were markedly engorged with fluid blood. There were no hemorrhagic areas. The brain and upper part of the cord appeared normal.

It was described as an anatomic death with acute splanchnic dilatation and gastric dilatation.

Dr. R. N. Harger, professor of biochemistry and toxicology at Indiana University, examined a sample of the stomach contents and reported that the sample of stomach contents weighed 0.81 ounce (23 Gm.) and consisted of a grayish white fluid. Since no tests for amphetamine sulfate suitable for analyzing material of this kind had been published, it was necessary for him to develop a test for this purpose. After considerable experimentation a test was devised which would show the presence or absence of this drug and which would give an approximate idea as to the quantity present. This test was then applied to the stomach contents. The results indicated the presence of a small trace of a substance giving the typical reaction for amphetamine. From the results obtained, Harger estimated that this sample of stomach contents contained about 0.25 mg. of amphetamine sulfate. Further tests were made for other poisons, including strychnine, but the presence of no other poison was revealed.

The results indicated that the deceased had ingested amphetamine sulfate shortly prior to his death. While the quantity of amphetamine sulfate found was very small, it of course represented only the unabsorbed drug. Since this drug is rapidly absorbed, the finding of a definite quantity in the stomach would indicate either very recent administration or the taking of a rather large dose. While amphetamine sulfate is considered a relatively safe drug, it has proved to be quite toxic in a few cases.

The student's examination paper was carefully examined and there was no indication in his writing that he had been having the slightest difficulty. Since it was a technical examination it was necessary to rely on the professor's judgment with regard to any disturbance of cerebration. After examining the answers which the patient had written, the professor stated that "the boy was writing a very good paper and had made good progress in the examination during the hour which he had written." Therefore it was concluded that this collapse came on very suddenly and without warning.

The student's room mate informed me that the patient had been making a practice of taking half an amphetamine sulfate (5 mg.) tablet half an hour before each examination but that he did not, so far as the informant knew, take any at night. During the four days prior to his death he had had about six examinations. Therefore it is probable that he had taken 30 mg. of amphetamine sulfate during the few days prior to his death, 10 mg. being taken on the day of his collapse. How much more he had taken it was not possible to determine. The twenty-five tablet bottle that he had possessed contained only ten tablets; one and one-half tablets had been given away. However, his room mate was very certain that the "brain tablets" had been in the patient's possession for a long time, "possibly a year."

All his friends agreed that the patient was a good student and had been working hard to make good grades on these examinations so that he would be placed on the honor list. He was also a good athlete and had been contemplating competing in the 220 dash in the spring. Less than a year before he passed an insurance examination and was given a preferred risk rating. There was absolutely no history of epilepsy or migraine.

COMMENT

Four important factors figure prominently in this student's death: They are a large meal, the nervous tension of the examination, fatigue and amphetamine sulfate. Probably no single one of these factors would have caused a sudden collapse

with death in a healthy person such as the patient was, but when all were present simultaneously the situation was changed. Since it is known that severe collapse can occur following the use of amphetamine sulfate in fatigue states, it is probable that it contributed to the fatal collapse in this case. The range of sensitivity to the drug is wide, and it is also possible that it may have cumulative effects. It is my belief that had the patient not been taking amphetamine sulfate he would have been able to recover his vasomotor stability when he collapsed, and this case is being reported in order that the promiscuous use and drugstore sale without a prescription of amphetamine sulfate as a "pep pill" be discouraged.

610 Columbia Street.

PULMONARY ACTINOMYCOSIS: RECOVERY AFTER THYMOL THERAPY

L. E. ETTER, M.D., AND F. L. SCHUMACHER, M.D.
PITTSBURGH

A study of the literature, with particular reference to pulmonary actinomycosis, reveals that the disease is usually fatal. It is characterized by a long, progressive course of from three months to several years. Typically, these cases progress from miliary consolidations to massive fibrosis, multiple abscesses and finally sinus formations through the chest wall.

Potassium iodide and radiation therapy have been used in the treatment, but recovery after pulmonary involvement has seldom occurred.

Myers [1] reports the successful treatment of five of his six cases of actinomycosis affecting different portions of the body. His method of oral administration of thymol was followed in the treatment of the patient here described.

Roentgenologic and bacteriologic evidence of pulmonary actinomycosis were both unquestioned in this patient. Several radiographic examinations subsequent to the institution of thymol therapy demonstrated progressive resolution of a lesion that extensively involved the right lung.

REPORT OF CASE

J. G., a teamster aged 43, became ill April 1, 1938, with a severe cough and pain in the right chest and back. Sputum was scanty at first and slightly streaked with blood.

When first seen by one of us (L. E. E.) on April 11, he was orthopneic, the respiratory rate was 40, the pulse was 106 and the temperature was 103.2 F. There was marked retardation of the respiratory excursion of the right chest, dulness over the upper portion posteriorly with distant bronchovesicular breathing and many sibilant rales. There were moist rales at the left base but no dulness. The supposition was that the patient had had a right lobar pneumonia followed by pleurisy with effusion and that an empyema had superseded it.

Treatment was symptomatic, and after one week in which there was no improvement he was hospitalized. The first roentgen examination eighteen days after onset revealed a dense thickening of the tissues over the apical and peripheral portions of the right upper lobe extending down as far as the interlobular sulcus. There were unusual visualization of the pleural margins of the sulcus and a triangular consolidation at the right hilus, the apex of the triangle extending outward into the lung parenchyma. The right diaphragm was higher than normal, and the right chest was smaller than the left with the ribs lying flatter.

Thoracentesis two days later produced 10 cc. of a straw colored fluid which, when cultured, produced staphylococci. The blood picture at this time was 4,200,000 red cells, 18,500 white cells, 82 per cent polymorphonuclears and 18 per cent lymphocytes.

The course of the disease was that of a progressive inflammatory reaction with a septic type of temperature beginning on the eighth day after admission and ranging from 99 to 103 F.

A second roentgen examination was made April 28. The lesion in the upper lobe was not greater in size—in fact, the apical portion had resumed a more normal appearance. It bulged downward as though suspending a large amount of fluid. The hilus consolidation increased in size and reached farther toward the periphery, while the dome of the right diaphragm presented two distinct convexities. The middle lobe was entirely involved and the lower lobe remained normal.

The marked involvement of the peripleural tissues at this period, together with the decrease in the size of the lung field and the acute inflammatory reaction, suggested a probable fungous infection. Since the sputum had been negative for acid fast bacilli or other definitely pathognomonic organisms, one of us (F. L. S.) asked that search be made for the ray fungus or other fusospirochetal organisms. The ray fungus (radiating mycelia) was identified in the patient's sputum May 2 and on subsequent examination. Potassium iodide up to 50 drops three times a day was well tolerated but failed to produce any change in the physical signs at the end of eighteen days of treatment. The foul smelling sputum containing many sulfur granules increased in amount.

A roentgenogram May 3 indicated a slightly greater density in the consolidated (?) areas with a greater decrease in the size of the right chest. At the time of the patient's discharge there was the typical appearance of a lung abscess in the lower part of the upper lobe with a fluid level.

The thymol therapy as suggested by Myers was started as soon as the patient returned to his home. He was given three capsules containing 10 grains (0.65 Gm.) each in the morning with a glass of milk. The first dose caused some nausea and gastric distress but there was no vomiting. The 30 grain (2 Gm.) dose was then given for seventeen days successively in the same manner.

Immediately after the beginning of the thymol therapy there was progressive clinical improvement. Expectoration became less, dyspnea decreased. The cough stopped gradually. Temperature, pulse and respiration dropped steadily. The patient gained in weight and strength.

A roentgen examination at the office June 15 demonstrated a complete resolution of the process in the middle lobe. There was an area of only about 4 cm. in diameter in the upper lobe that seemed to be in the pleura or peripleural structures. Another examination failed to disclose any evidence of bone involvement. The right pulmonic field compared favorably with the left, although the ribs still had the flat appearance. The right diaphragm had not returned to its original shape.

A roentgenogram of the chest made in October 1938 failed to reveal any evidence of a parenchymal lesion.

COMMENT

Actinomycosis of the lungs so seldom occurs that the diagnosis is not readily made until the disease is fairly well advanced and then, probably in most cases, by exclusion.

Turner [2] says that the lungs are third in frequency of involvement and that the disease appears as two types, one a miliary type with the granulomatous masses along the inner lining of the bronchi, and a second type beginning at the hilus and extending into the lung parenchyma, producing the lung abscesses. These abscesses are more progressive than the usual lung abscesses seen in tuberculosis or pneumonia.

In our case the abscess cavity seen May 18 had completely disappeared after a thirty day interval. The type of onset in our case is not known, though we feel justified in saying that it probably began as a hilus type because of the dense, triangular area visualized at the right hilus at the first examination. The apical area of involvement could have been an extension—aspiration—such as Turner speaks of when he says that metastatic areas appear without adequate explanation and alternate with areas of normal tissue.

Harrison [3] also speaks of the two forms of onset.

Actinomycosis of the miliary type is mentioned by Sante,[4] who says that it must be differentiated from the moderately advanced stage of the infiltrative type of tuberculosis.

In Rabin's [5] opinion the roentgen picture is characteristic and is dependent on the fact that the disease soon extends from

1. Myers, H. B.: Thymol Therapy in Actinomycosis, J. A. M. A. **108**: 1874 (May 29) 1937.

2. Turner, G.: Radiology **7**: 39 (July) 1926.
3. Harrison, B. J. M.: Roentgenology, New York, William Wood & Co., 1936.
4. Sante, L. R.: Annals of Roentgenology, **15**, 1930.
5. Rabin: Diagnostic Roentgenology, New York, Thomas Nelsons' Sons, 1938, pp. 143-145.

the lung through the pleura and produces an intense fibrosis in the peripleural tissues. One of us (F. L. S.) saw such a case in 1926. The fibrosis of the pleura was so marked that the left pulmonic field was of a homogeneous density without displacement of the mediastinum. While attempting to aspirate, one had the sensation of passing the needle through a heavy layer of leather. The diagnosis was confirmed by bacteriologic examination of the sputum. The case terminated fatally.

In our present case the rapid resolution of the pathologic condition and the marked clinical improvement with the thymol therapy suggest that it be given a thorough trial in similar cases.

Since the foregoing article was written, one of us (F. L. S.) has seen two additional cases of pulmonary actinomycosis and one of coccidioidal granuloma. The latter is usually called California disease, and yet we find, in going over our patient's history, that his entire life has been spent in Ohio and Pennsylvania. One is inclined to forget the possibility of fungous infection, especially when dealing with a chronic lung condition. However, we believe that any case of chronic lung suppuration that presents unusual appearances should be carefully studied for evidence of fungous infection.

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WOOD SMOKE AS A CAUSE OF ASTHMA

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CHICAGO

M. F., a white man aged 35, had worked as a chauffeur and a telephone lineman previous to his present occupation as a fireman. He was referred to us in 1930 by the Chicago Fire Department as a suspect malingerer because of his complaint of asthma after each fire. His past history was negative except for scarlet fever during childhood. No history of atopy was obtainable either in him or in his family. He had never previously had respiratory symptoms. The Chicago Fire Department informed us that there are 2,795 men employed in Chicago as firemen and that about 20,000 fires occur every year. This was the first case of asthma the department had observed that was attributable to smoke.

During the first eight months of his work as a fireman he had been to about 250 fires. Some of these were associated with severe smoke exposure, without, however, any ill effects. About eight months after being in the service he was exposed to a larger amount of smoke than in any previous fire. No ill effects were noted until three hours later, when he was awakened from a sound sleep by a feeling of tightness of the chest, wheezing and orthopnea. He was hospitalized for a week. During the latter part of this period his temperature rose to 104 F. This subsided by the end of the week. During the following week he coughed up a sputum which had a "sweet taste." Thereafter, every indoor fire which was associated with even a slight inhalation of smoke would produce asthma four hours after exposure. No discomfort was experienced during the period of exposure to the smoke, but four hours later a typical attack would start and last for from two to three days.

In January 1930, when he reported for study, he was exposed to destructive distillation of sawdust in an enclosed room for about forty-five minutes. After leaving the room his eyes were suffused and tearing but he was otherwise comfortable. The chest was examined and no wheezing was noted. At the end of two hours he complained of slight tightness of the chest, but still no wheezing was noted. At the end of four hours the attack of asthma was typical. Marked wheezing was present throughout the lungs. He was hospitalized. No relief was obtained from three doses of 1 cc. of a 1:1,000 solution of epinephrine injected subcutaneously every two hours, until it was noted that his smoke saturated clothes were alongside the bed. When these were removed and the room was aired out, the epinephrine gave him complete relief. He was well in twenty-four hours except for a slight wheeze, which continued for about a week.

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He was tested by scratch as well as intracutaneous tests with wood smoke extract. The tests were negative. Acetic acid, the main product of wood distillation, was sprayed in the nose without producing symptoms.

His work was changed to that of driving a flood light fire apparatus. He has been exposed to only exceptionally large fires, where smoke has been present outdoors. He has experienced short attacks of wheezing after prolonged exposure to smoke outdoors, but he has had no actual attack of asthma following such contact.

The patient was reexamined by us in 1935. Dr. W. W. Duke,[1] who had observed a similar case, suggested that we retest the patient with wood smoke extracts, with which he supplied us. These failed to give reactions when tested intracutaneously. In addition, his throat was sprayed thoroughly with the undiluted extract, much of which he inhaled, without producing an attack of asthma.

In June 1938, eight years after he had first reported for study, he again required hospitalization for severe asthma following exposure to a fire. He had been compelled to substitute for his superior officer and enter a burning building. Four hours later, as in his previous experiences, he developed severe asthma which lasted three days. This was his first attack in eight years and his first exposure to wood smoke during this period.

COMMENT

Asthma due to inhalation of simple chemical substances has been reported. It is always problematic whether one is dealing with a primary irritant effect or whether one is dealing with true allergy. The studies of Mayer,[2] Curschmann[3] and Gerdon[4] on ursol (paraphenylenediamine) in fur dyers as well as their experimental work with animals seem to indicate that true respiratory allergy can occur to simple chemical substances. On the other hand, Hanzlik[5] and others believe that the primary toxic effects of ursol are active here. Recently Romanoff[6] has reported cases of asthma due to inhalation of sulfur dioxide. Asthma due to inhalation of dyes has also been recorded (Rackemann). Many other simple chemical substances have been incriminated as etiologic agents in asthma.

SUMMARY AND CONCLUSIONS

A fireman who has been observed for the last eight years is sensitive to wood smoke. Exposure to the smoke in a confined place is apparently necessary to precipitate a typical attack of asthma, although wheezing may occur when he is exposed to smoke outdoors. The responsible substance in wood smoke has not been determined. An attack was produced experimentally by exposure to the fumes from the destructive distillation of wood. Cutaneous tests and inhalation of wood smoke extracts gave negative results. It is interesting to note that the patient has been free from symptoms for eight years following change of occupation, with recurrence of symptoms following recent exposure.

The facts in this case which point to specific hypersensitivity are:

1. The absence of previous symptoms.
2. The eight months incubation period.
3. The recurrence of attacks with each subsequent exposure thereafter.
4. The four hour interval following exposure until the occurrence of symptoms indicates the unlikelihood of a primary irritant effect.
5. The return of symptoms on the first reexposure even years later.
6. The fact that his co-workers are unaffected by similar exposures.

1. Duke, W. W.: Personal communication to the authors.
2. Mayer, Rudolf L.: Asthma und Ekzem bei den Pelzarbeitern, Arch. f. Dermat. u. Syph. **158**: 734, 1929.
3. Curschmann, Hans: Klinisches und experimentelles ueber das anaphylaktische Bronchialasthma der Fellfaerber, München. med. Wchnschr. **68**: 195, 1921.
4. Gerdon, C.: Beobachtungen und Untersuchungen ueber das anaphylaktische Bronchialasthma infolge p-Phenylendiamin der Fellfarbstoffe, Zentralbl. f. Gewerbehyg. **8**: 188, 201, 1920.
5. Hanzlik, P. J.: The Pharmacology of Some Phenylenediamines, J. Indust. Hyg. **4**: 386-488, 1923.
6. Romanoff, Alfred: Sulfur Dioxide Poisoning as a Cause of Asthma, J. Allergy **10**: 166, 1939.

Special Clinical Article

EMERGENCY TREATMENT OF ACUTE HEART FAILURE

CLINICAL LECTURE AT ST. LOUIS SESSION

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The type of emergency treatment indicated in heart failure depends to some extent on the etiologic basis of the heart failure. The need for emergency treatment depends on the character of the pathologic process which preceded the break in compensation and on the severity of the clinical abnormality which is the expression of this particular underlying pathologic condition.

In the presence of heart failure the clinician must attempt to establish, if possible, the underlying cause and the type of failure which is present. This assumes that he is not misled by the many vagaries of cardiac rhythm which are so often misinterpreted as evidence of true failure. Inability to diagnosticate properly the cardiac state and evaluate the abnormalities of rhythm often lead to grave mistakes in diagnosis, resulting in many cases in unending psychologic turmoil in the patient who has been exposed to the incorrect diagnosis. Cardiac neuroses that may serve to incapacitate a patient are often born of the fear which arises from the false diagnosis of "heart trouble."

In emergency cardiac states it may not be possible to determine the underlying cause. In such conditions the emergency treatment must be instituted which is indicated by the evident clinical manifestations. Such treatment must needs be prompt to be life saving. However, when the time permits, a brief history of the condition may be obtained from the patient or his relatives. Valuable information as to the possible underlying clinical factors responsible for the acute attack may be obtained in the history. Much of value regarding the existence and progression of preceding cardiac or cardiovascular factors may be learned by well chosen questions. Such apparently simple facts as those detailing the onset and progress of the acute attack may give information of inestimable value with specific clues as to the required treatment.

The physical examination of the heart in cardiac failure is a sine qua non of diagnosis. Such important facts as the rate, rhythm and character of the heart sounds should be carefully noted. Disturbances of mechanism indicating heart block, auricular fibrillation or flutter may be evident and extremely valuable in determining causation of failure and in indicating treatment. When possible, a general examination of the patient should be conducted with particular regard to other signs of cardiac failure such as orthopnea, enlarged liver, ascites and peripheral edema or anasarca.

For the purpose of classification, acute cardiac failure may be grouped into that associated with the infectious diseases such as pneumonia, diphtheria, sepsis and that occurring in the course of thyrotoxicosis, syphilis, arteriosclerosis, hypertension and rheumatic heart disease. The clinical cardiac manifestations in the latter diseases may be protean, seldom conforming to a constant pattern and hence seldom of themselves indicative of the underlying pathologic condition.

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The provoking causes of heart failure are multiple. Acute infections sometimes mild in character, such as a grippal or a respiratory infection, may serve to initiate a break in compensation in a heart previously diseased but well compensated. Recurrent rheumatic infections may undermine the integrity of the heart muscle, as will repeated carditis with tonsillitis occurring regularly once or twice a year. Arrhythmias are often the determining causes of acute cardiac failure. The postoperative cardiac failure is often transient and may be associated with pulmonary embolism. Extensive embolism may result in immediate death. Extreme emotional states, excitement, grief or sorrow may play significant roles in the causation of cardiac failure.

The acute heart failure of the infectious diseases may respond to emergency treatment, but since it occurs after severe and prolonged toxemia the response to treatment may be unsatisfactory. The most important fact in the therapy of this type of cardiac disturbance is concerned with the prevention of serious cardiac accidents. This may be effected by the exercise of proper care of the patient by the physician during the acute illness. The heart should be carefully watched during the acute stages of the disease so that, when signs of failure appear, proper therapy may be instituted early. Prevention of cardiac disability in the infectious diseases is far more important than the treatment of the cardiac emergency.

In the diagnosis and evaluation of cardiac states associated with failure, it may be well to mention some clinical conditions which, in the intensity of the cardiac manifestations, may simulate acute cardiac failure. Chief among these is pulmonary embolism with infarct, presenting a symptom complex that closely simulates coronary thrombosis with many of the dramatic phases of the latter condition. Cardiac deterioration in pulmonary infarct may be rapid and startling. The symptomatology of pulmonary embolism bears so striking a resemblance to that of coronary thrombosis that it may be differentiated only by means of the electrocardiogram. Sufficient time must elapse to produce diagnostic changes adequate to assist in the solution of this difficult problem.

Other conditions which may cause difficulties in diagnosis are spontaneous pneumothorax inducing severe cardiorespiratory symptoms, massive collapse or atelectasis producing a clinical picture often confused with true heart disease because of the respiratory difficulty and pleural effusion. The last named condition is often characterized by a slowly developing dyspnea chiefly on exertion, closely simulating heart failure.

SYMPTOMS AND SIGNS

The symptoms and signs of cardiac failure may be grouped for purposes of convenience into those occurring with left ventricular failure and those occurring with right ventricular failure. In left ventricular failure, cardiac asthma or paroxysmal dyspnea with edema of the lungs is a frequent sign alone or with Cheyne-Stokes respiration. These will be discussed later at greater length. The cardiac rhythm in this type of failure may be of the gallop type, or any of the arrhythmias may be present. Pulmonary congestion is frequent and in this condition the x-rays may aid in diagnosis. Vital capacity is reduced to as low as 60 per cent of normal while circulation tests reveal a prolonged decholin time with a normal ether time.

In the right ventricular failure, dyspnea is likewise common but it is more apt to be of the simple type.

The liver is, as a rule, enlarged and may be tender and pulsating. Hydrothorax, frequently unilateral, is common. With dilatation of the right ventricle and right auricle, a dulness to percussion may be elicited at the lower end of the sternum. This may also be determined by means of x-ray examination. Generalized edema with marked gain in weight may be present early in the failure. A gradual unexplained weight gain may be the forerunner of a break in compensation. Jaundice is not uncommon. The finding of albumin and erythrocytes in the urine indicates the existence of a renal congestion. Special tests of the circulation reveal an increased venous pressure together with a prolongation of the ether time. Prolonged ether and decholin time indicate a failure of both right and left ventricles.

In addition to the foregoing symptoms and signs of cardiac failure, others of variable frequency and significance may be added. The following may serve to aid in the diagnosis of the underlying pathologic condition producing the failure:

1. Pallor may be present more frequently than cyanosis.
2. Precordial discomfort may or may not be present. When present and related to exercise, it may have a definite significance.
3. Palpitation is frequently present without a clue as to the underlying associated rhythm.
4. Tachycardia is common but bradycardia may occur at times with disturbance of the sinus node or the bundle of His.
5. Heart measurements may be greater than normal as evidence of hypertrophy or dilatation in true heart disease.
6. Heart sounds may be variable in character. They are usually weak; they may be irregular. The type of arrhythmia must be determined. Murmurs vary with the type of disease. A systolic murmur at the apex is most frequent.
7. Gallop rhythm, as mentioned, is common. Heart block may appear with involvement of the conduction system.
8. Lungs may show evidence of basal congestion with rales and impaired resonance. Dulness may be found when fluid is present in the pleural cavity. The respiratory rate is usually increased.
9. Fever and leukocytosis may coexist with infectious processes. Both are found consistently with coronary thrombosis.

DYSPNEA

Among the premonitory symptoms of heart failure, dyspnea stands out preeminently. Dyspnea may of itself serve to call attention to an impending heart failure. It may manifest itself as the simple or exercise type evident on moderately strenuous exertion such as walking fast or climbing stairs. It may or may not be accompanied by a sensation of precordial pressure or pain. Cardiac palpitation is a common associate of the exercise, dyspnea disappearing with rest. Such a complex symptomatology may be present for months before more evident signs of failure appear.

A second form of dyspnea may occur as a paroxysmal or nocturnal dyspnea, sometimes termed cardiac asthma. Accompanying this is a pulmonary edema present in varying degrees. The onset of the attack is as a rule sudden, occurring during sleep or after some exertion such as coughing. The patient often awakens gasping for breath and conscious of the rapid heart action. Precordial pain is frequently present and sweating is a distressing symptom. Cough with varying amounts of sputum is present with edema. The attack is at times accompanied and aggravated by severe fright.

The mechanism of the attacks is probably an acute left ventricular failure following sudden elevation of blood pressure occurring during sleep as a result of exciting dreams, urinary bladder discomfort or other sensory stimuli. This is the so-called "back-pressure theory" in which a pulmonary congestion occurs. Other suggested explanations have been the "nerve theory" which presupposes an alteration in the nervous control of the bronchial musculature and the theory of "failure of forward pressure" with consequent accumulation of acid substances in the tissues.

A third type of dyspnea which is important, extremely distressing and often unrecognized as a sign of cardiac failure is the Cheyne-Stokes respiration. This type of dyspnea occurs frequently in heart disease, being found most often in arteriosclerotic and hypertensive states. It may be an index of left ventricular failure in these two conditions. The duration of the periods of apnea varies from ten to forty seconds. The apnea is more disturbing when nocturnal. The patient often awakens during the long periods of apnea to find himself struggling for breath. The fear induced by this attack prevents sleep and so the element of prolonged exhaustion is added to the already embarrassed myocardium, further reducing the cardiac reserve.

The foregoing forms of dyspnea, from the simplest or exercise type to the most complex, may be valuable in determining the extent and severity of cardiac disability. Immediate understanding of the significance of this symptom, particularly in its more serious manifestations, the nocturnal dyspnea with pulmonary edema and the Cheyne-Stokes respiration will result in prompt and adequate therapy with the consequent restoration of cardiac integrity.

The essential treatment of cardiac failure depends, as has been said, on the factors underlying the failure and also on the clinical expressions of the failure. It is necessary then, in any failure, to determine whether the heart action is arrhythmic or rhythmic and whether or not edema exists. The location of the edema, whether general or pulmonary, may be of great importance.

If the heart is arrhythmic, the character of the arrhythmia should be determined, instrumental aids being used for more accurate determination when possible. An electrocardiogram may reveal not only the arrhythmia but also the character of any underlying myocardial changes.

GENERAL PRINCIPLES OF TREATMENT

With the foregoing differentiations and clinical determinations in mind, one may proceed to the consideration of certain general principles of treatment as applied to acute cardiac failure:

1. Rest in bed should be absolute. It presupposes adequate and proper nursing care. In simple congestive heart failure with normal rhythm, rest in bed may be modified to prevent formation of venous thrombi, which may develop as a result of the marked slowing of the circulation.
2. Sedation should be obtained by morphine given subcutaneously or intravenously in adequate doses. In the acute stages of heart failure, rest is most important. Dilaudid hydrochloride may be used in doses of 1/64 to 1/32 grain (from 1 to 2 mg.). Respiratory depression may be controlled by using caffeine, atropine or a respiratory stimulant such as lobeline or coramine. Barbiturates may well serve the purpose.
3. When cardiac failure is accompanied by arrhythmia, the tachycardia should be treated and for this purpose digitalis or quinidine should be used in adequate doses. When sinus rhythm is present with cardiac failure the effect of absolute rest in restoring cardiac integrity may be determined before digitalis is used. Digitalis has its most pronounced effect in cardiac failure. In circulatory failure the effect of digitalis is less pronounced and may even be negative.

When auricular fibrillation or auricular flutter exists, digitalis should be used in large and adequate doses. In the former condition quinidine may be of value in restor-

ing rhythm. When the arrhythmia is due to auricular or ventricular paroxysmal tachycardia, quinidine is usually of greater value. In the latter condition digitalis may prove to be dangerous by converting the tachycardia to ventricular flutter or fibrillation.

What may be expected from the use of digitalis in cardiac failure due to the various underlying causes? In auricular fibrillation accompanying mitral stenosis, arteriosclerotic or thyroid heart disease the results following its use may be excellent. In thyroid heart disease the effect is usually less satisfactory than in the two preceding conditions. In mitral stenosis with sinus rhythm the results with digitalis are, as a rule, not as good as when fibrillation is present. In hypertensive and arteriosclerotic heart disease with failure and sinus rhythm a good result may be obtained. Aortic insufficiency with failure shows but little result from the use of digitalis.

The method of dosage of digitalis varies with the urgency of the condition to be treated. Hence digitalization may be accomplished slowly or rapidly. Oral administration of the drug is the method of choice and can be used when the stomach will tolerate the drug. When a gastric upset renders this route impossible of use, other routes of administration may be employed such as the intramuscular, the intravenous or the rectal route. In oral administration, the dosage and the rapidity of administration will depend on the severity of the failure. Where the urgency of the case demands rapid digitalization, the total dosage of 15 cc. or 22½ grains may be given orally in three equal doses within eight, twelve or twenty-four hours.

The dosage of digitalis when administered either intravenously or intramuscularly will likewise vary as it does with the oral administration. A dose of 2 cc. twice daily will usually suffice to restore compensation.

The drug may be administered rectally in the form of suppositories, as an infusion or as the fat-free tincture. The strength of the infusion is usually from 15 to 22 grains (1 to 1.4 Gm.) of the powdered leaf in 60 cc. of water. Of this, 30 cc. is given morning and evening. The fat-free tincture may be given in doses of 40 minims (2.5 cc.) twice a day. In severe auricular flutter this dose may be increased to 60 minims (4 cc.) twice a day.

A fact of great importance during the process of digitalization is the incidental occurrence of nausea and vomiting or the persistence of these symptoms, present before using digitalis. These are often falsely interpreted as signs of digitalis intoxication. The failure to understand properly and evaluate these symptoms, which are due to the congestive failure frequently, results in a catastrophe because of the discontinuance of the digitalis before adequate digitalization has been obtained. Definite signs of digitalis toxemia such as pulsus bigeminus, premature beats or the electrocardiographic signs of overdigitalization should be present before one discontinues the drug in the presence of gastric symptoms.

Digitalis may be dangerous when used in conduction disorders and in coronary sclerosis with a high degree of block. In the latter condition it may set up a ventricular fibrillation.

Strophanthin (crystalline ouabain) may be used in acute failure with or without generalized edema in cases in which digitalis has not been given for at least three days. The dose of 0.0003 Gm. (1/200 grain) is given intravenously and repeated in twelve hours. Subsequent doses may be given at twenty-four hour intervals. It may have some value in cases of gallop rhythm with failure. Here it may be given in two daily doses combined with theophylline with ethylene diamine (aminophyllin) or mercupurin.

Diuretics have their most important use in the treatment of subacute or chronic congestive heart failure. However, they may prove to be valuable in restoring compensation in acute failure by prompt reduction of blood volume with rapid and increased diuresis, thus removing one source of ventricular strain. The diuretics most frequently used are the xanthine derivatives and the mercury compounds.

Of the former group the most common are theobromine, with sodium salicylate, theobromine with calcium salicylate, theophylline, theocin, theophylline with ethylene diamine or aminophyllin. The last named is used orally, rectally or intravenously. When given intravenously with dextrose, from 10 to 20 per cent in amounts of from 50 to 500 cc., it serves as an excellent diuretic. The intravenous dosage of the drug varies from 3 to 7½ grains (0.2 to 0.5 Gm.). It may be given twice a day, the frequency of dosage and amount of the drug being governed by the existing condition.

The mercurial diuretics most commonly used are mercupurin, salyrgan and novasurol. The last named, being more toxic than the two preceding, is seldom used. There is little choice between the first two drugs either as to effect or as to tolerability. The former of the two may be slightly less irritating to kidney tissue. These diuretics may be used in the presence of acute congestive failure and the diuresis may be immediate and effective. They may be given intramuscularly, intravenously, rectally as suppositories and intraperitoneally diluted with ascitic fluid. The dose varies from 0.5 to 2 cc. and the administration may be daily or every three to five days depending on the severity of the condition and the result obtained with a given dose.

I have discussed the symptoms of paroxysmal dyspnea as evidence of acute left ventricular failure. Since this condition may at times be extreme, it is possible that one may be obliged to regard it as of such severity as to require immediate and urgent treatment. In that case morphine should be given in adequate doses to produce complete relaxation. Any respiratory depression following the use of this drug may be combated by the drugs mentioned. Venesection with the removal of from 400 to 500 cc. of blood may produce striking immediate results when pulmonary congestion is severe. Strophanthin intravenously may be given with the usual precaution relative to the antecedent use of digitalis. Dextrose in a concentration of from 25 to 50 per cent and in amounts of 50 cc. may be given intravenously with or without aminophyllin. The latter is of value in arteriosclerotic and hypertensive heart failure. Ligation of the lower extremities may be of value by reducing the volume of blood flowing to the heart. Mercurial diuretics may be given at the time of the attack. When these are given nightly for a few consecutive nights they may quiet the nocturnal attacks occurring in aortic regurgitation of syphilitic origin.

Glyceryl trinitrate may be of value. Oxygen inhalations usually are of definite benefit. The concentration of the oxygen may be from 50 to 90 per cent with a flow of from 4 to 6 liters a minute. Caffeine with sodium benzoate from 1 to 3 grains (0.06 to 0.2 Gm.) may be given intramuscularly or subcutaneously every three to four hours.

The distressing nocturnal symptoms accompanying the apneic intervals occurring in Cheyne-Stokes respira-

tion may be relieved by the intravenous use of aminophyllin twice daily in doses of 7½ grains (0.5 Gm.). This may be given in water, saline solution or dextrose solution. It should be given slowly. The determination of the possibility of the Cheyne-Stokes respiration as the factor responsible for the nocturnal dyspnea may be made by using a test dose of 5 grains (0.3 Gm.) of aminophyllin given rectally by suppository. If relief is obtained by this means the active intravenous treatment as mentioned before may be instituted.

Acute heart failure may supervene in clinical conditions other than those so far considered. It may not present evidence of congestive failure. In heart block and the accompanying Stokes-Adams syndrome ventricular standstill may be followed by syncopal attacks and even convulsive seizures. The treatment of the ventricular standstill is designed to effect restoration of normal ventricular function and hence must be specific for that purpose. Epinephrine hydrochloride may be given intracardially in doses of 1 cc. in 1 : 1,000 solution. This treatment may likewise be effective in postanesthetic ventricular standstill. The technic of this injection is simple. A lumbar puncture needle is used and the needle is inserted into the heart through the fourth left intercostal space 2.5 cm. to the left of the left sternal border. Subcutaneous injections of the same drug in from 0.3 to 0.6 cc. doses may be given at frequent intervals as often as every two hours. As much as 1 cc. of the drug may be injected at two hour intervals without distressing constitutional symptoms. The drug should be avoided in ventricular tachycardia or fibrillation. Atropine sulfate in doses of from one-twentieth to one-twelfth grain (0.003 to 0.005 Gm.) may be given subcutaneously. Ephedrine sulfate may be of value and is given orally in doses of from three-eighths to one-half grain (0.024 to 0.032 Gm.) from three to four times a day. Barium chloride is used to increase ventricular irritability and is given in one-half grain (0.03 Gm.) doses three times a day. Digitalis and quinidine should be used only when acute failure supervenes.

Coronary thrombosis with extensive cardiac infarction may result in immediate death from cardiac failure. When this eventuality does not supervene, the cardiac manifestations may be severe and if not properly treated may terminate in failure. The general reaction to the thrombosis may be striking with all the signs of severe shock, including sudden reduction of blood pressure, tachycardia and interference with cardiac and peripheral circulation. The mechanism of the heart may be regular or irregular. When irregular, various types of arrhythmias may be present. The arrhythmias most apt to be present are paroxysmal ventricular tachycardia, ventricular fibrillation, auricular fibrillation, auricular flutter, bundle branch block, usually transitory, and auricular-ventricular block. This may be complete and, when so, usually indicates an involvement of the right coronary artery with posterior infarction.

The sequelae of this coronary accident may be striking and may appear separately or as steps in a gradually progressive condition. The most common of these sequelae are edema of the lungs, sudden cardiac failure, shock persisting to the second and third days with an unresponsive low systolic blood pressure, embolism either pulmonary or peripheral following the formation of mural thrombi at the site of the infarct, rupture of the heart muscle that may be partial and nonfatal, and lastly cardiac aneurysm, which may be diagnosticated by means of the fluoroscope.

The treatment of the acute coronary thrombosis, with which acute cardiac failure is always potentially associated, consists of rest, which must be immediate and absolute. Morphine should be used in large doses for relief of pain. It may be given intravenously if necessary to relieve severe pain and to secure rest. Vasodilators should be used and for this purpose theobromine with sodium salicylate (diuretin) or aminophyllin is most effective. The latter may be given intravenously in a dose of 7½ grains (0.5 Gm.). Glyceryl trinitrate should be avoided except when the systolic blood pressure is unusually high and when more rapid reduction of blood pressure is desired.

Strophanthin, to be given intravenously during the attack, is recommended by some foreign observers. Its use does not seem to be justified in the absence of cardiac failure. The existence of cardiac failure should likewise be the indication for the use of digitalis. The latter drug may be dangerous, as has been mentioned, when used in the presence of a high degree of heart block. Quinidine should be used when multiple extrasystoles appear. It may be used in a dose of 3 grains (0.2 Gm.) four times a day. Its use may prevent the development of paroxysmal ventricular tachycardia and ventricular fibrillation. The dose may be increased to 60 grains (4 Gm.) daily if needed to prevent the development of the latter condition. Oxygen inhalations may be of value in the first twelve hours after the attack.

It is not possible, in a limited presentation of this type, to discuss all the cardiac conditions that may result in failure. At best only general principles of therapeutic procedure can be discussed. Many of the cardiac arrhythmias, when severe, produce an appearance of failure and, in fact, with persistence of the arrhythmia may actually result in cardiac failure. Of these, perhaps the most common are auricular paroxysmal tachycardia and ventricular paroxysmal tachycardia. The former may be identified by the character of the onset and the cessation of the attack, which is typical. Treatment in the transient attacks seldom need be applied. In the more prolonged attacks, however, cardiac failure may supervene and so it may be advisable to restore normal rhythm as quickly as possible. For this purpose vagal or ocular pressure may be applied. Emetics may be of value. More recently acetyl-β-methylcholine chloride has been used in doses of from 10 to 50 mg. It is injected subcutaneously and has given good results. Quinidine in doses of 6 grains (0.4 Gm.) every two to four hours for five doses gives good results in selected cases. The use of digitalis to sensitize the vagus in the recurrent cases has many adherents.

Ventricular paroxysmal tachycardia is a far more potentially dangerous arrhythmia than the preceding because of the possibility of its transition into ventricular fibrillation or flutter. The attack is often ushered in by frequent runs of extrasystoles; clinically it may be indistinguishable from the auricular type. Quinidine in adequate doses, as much as 60 grains (4 Gm.) a day in divided doses, should be given at once. Digitalis, as has been said, may convert the condition into the more dangerous ventricular fibrillation.

CONCLUSION

A recapitulation may be made of some of the more important points mentioned in the emergency treatment of heart failure. Most important of all these points is the necessity for proper diagnosis of the type of existing heart failure. This should be arrived at by a history, physical examination and other diagnostic aids when

possible. The diagnosis of the underlying pathologic state of the heart and its clinical expression will determine the indications for the type of treatment to be instituted.

It is well to remember that it is not possible to group all cases of cardiac failure together and so to institute one type of treatment. Not all cases of acute failure require digitalis; in fact, in some cases the use of this drug may be dangerous. When the drug is required it should be given in adequate doses with the hope of restoring cardiac compensation as quickly as possible.

Adjuvants, such as rest and diuretics, should be used as indicated. One fact should stand out above all others: that is, one should not cease treating acute heart failure because of apparent lack of response, for restoration of the heart muscle to a compensated state is often obtained when least expected.

806 Missouri Building.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE. HOWARD A. CARTER, Secretary.

ATROPHY AND REGENERATION OF THE GASTROCNEMIUS-SOLEUS MUSCLES

EFFECTS OF PHYSICAL THERAPY IN THE MONKEY FOLLOWING SECTION AND SUTURE OF SCIATIC NERVE

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The treatment of paralyzed muscles of the flaccid type has been based chiefly on clinical experience. The measures commonly employed are electrical stimulation, massage and passive movement, heat, rest and muscle reeducation. The exact indications for the use of these procedures alone or in combination, however, are still a subject of controversy. Thus, in the treatment of poliomyelitis many clinicians claim that electrical stimulation is contraindicated especially in the early stage of paralysis. They advocate rest. Others stressing the rapid rate of atrophy and degeneration maintain that something should be done to prevent, so far as possible, the progress of atrophy and fibrosis. They decry rest and advocate light massage and passive movement to be followed later by electrical stimulation. A review of the literature reveals considerable confusion and disagreement regarding the value of these measures, with their indications and contraindications.

In view of the need for more precise knowledge as to the actual effects of the commonly used physical therapeutic measures, a series of animal experiments has been undertaken. Macacus rhesus monkeys were used. In the first group of experiments an attempt was made to study the effects of treatment on the course of atrophy and degeneration of denervated muscles. In the second series, treatment was carried out for longer periods of time with a view toward studying the effects on regeneration and restoration of the paralyzed muscles and their nerves.

In the treatment of the lower motor neuron type of paralysis the chief principles of therapy have been based on the concept that inactivity is responsible for the atrophy. The fact that denervated muscle continues to respond to the galvanic current has been utilized in the treatment of flaccid paralysis. By stimulating the paralyzed muscles with the galvanic current an artificial stimulus is substituted for the normal voluntary impulse.

The earliest experimental works on this problem were those of Reid [1] and Brown-Séquard [2] on frogs and rabbits. They reported that daily electrical stimulation prevented atrophy of muscles paralyzed by nerve section. This idea held sway until 1915, when Langley [3] and his associates repeated the experiment on rabbits and found that wasting of the paralyzed muscles progresses despite daily stimulation by the galvanic current.

Does daily electrical stimulation prevent muscle atrophy? In the first experiment of the present investigation the gastrocnemius-soleus muscles were paralyzed by sectioning the sciatic nerve in both lower extremities of two monkeys. The severance was made at the level of the great trochanter. The extremities were kept in protective plaster of paris casts, which were removable. The muscles of the left side were treated by galvanic stimulation, ten good contractions being given daily, the treatment beginning on the day following the operation. The paralyzed muscles of the right lower extremity received no treatment. At the end of six weeks the gastrocnemius-soleus muscles were removed in toto from both extremities and immediately weighed. The results may be seen in table 1.

The treated muscles showed slightly more wasting than the untreated. One may question the validity of comparing the same muscle groups of opposite extremities. Our experience with a very large number of monkeys has assured us that the normal variation in weight of the same muscle groups in opposite extremities is very slight. This has been found to be true also in rabbits by Lipshutz and Audova.[4]

In the second experiment three groups of monkeys in which one sciatic nerve was sectioned and sutured were treated as follows: One group received daily electrical stimulation (ten good contractions by galvanic current), another daily massage and passive movement, and the third group complete rest by immobilization in a cast. The opposite extremity served as the control in each animal. The paralyzed extremity was placed in a removable protective plaster cast in all groups. Treatment was not begun until two weeks after the nerve section, during which period the paralyzed muscles were kept at rest in a neutral position in their protective casts. At the end of four weeks of treatment (six weeks after nerve section) the gastrocnemius-soleus muscles were removed and the amount of atrophy was determined by comparing the weight

This work was carried on with the assistance of grants from the Council on Physical Therapy of the American Medical Association.

From the Departments of Nervous and Mental Diseases, Anatomy and Physical Therapy, Northwestern University Medical School, and Department of Neurosurgery (Dr. Cleveland), Marquette University.

1. Reid, John: Edinburgh Month. J. M. S., May 1841; quoted from reprint in Physiol., Anat. & Path. Researches, Edinburgh, 1848.
2. Brown-Séquard, C. H.: Lectures sur les vasomoteur, Paris, 1860; quoted from Lippmann, R. K., and Selig, Seth: Surg., Gynec. & Obst. **47**: 512 (Oct.) 1928.
3. Langley, J. N., and Kato, T.: The Rate of Loss of Weight in Skeletal Muscle After Nerve Section, with Some Observations on the Effect of Stimulation and Other Treatment, J. Physiol. **49**: 432, 1915.
4. Lipshutz, A., and Audova, A.: The Comparative Atrophy of the Skeletal Muscle After Cutting the Nerve and After Cutting the Tendon, J. Physiol. **55**: 300, 1921.

of the paralyzed muscles with that of the normal control side. The results may be seen in table 2.

The amount of atrophy was practically the same in the three groups. We may conclude, therefore, that muscle atrophy following nerve section in the Macacus rhesus monkey progresses up to a period of at least six weeks despite treatment by electrical stimulation, by passive movement and massage or by complete rest. It should be emphasized that these observations deal only with the amount of atrophy. It may be mentioned at this time that demonstration of atrophy in terms of wasting of muscle is not an accurate guide to the severity of the lesion. The qualitative changes occurring in the muscle fibers, intramuscular nerves and blood vessels must be evaluated. The degree of muscle degeneration and fibrosis and the amount of functionally preserved muscle fibers are the important determinants of the future restoration of the muscle when reinnervated.

What are the effects of treatment on the regeneration and restoration of muscles? The following experiments were carried out to compare the effects of electrical stimulation, of massage and passive movement and of immobilization, maintained for a period of time long enough to permit regeneration of the nerve to the paralyzed muscles. Four groups of animals were used in this experiment. In each monkey the right sciatic nerve was severed and sutured immediately. Removable plaster of paris casts were applied to the paralyzed extremity for protection and also to serve as a splint for the denervated gastrocnemius-soleus muscles. A period of four weeks of rest was allowed before active treatment was begun. One group received daily electrical stimulation (ten contractions, galvanic current), another group received daily massage and passive movement, a third group received the combination treatment of daily electrical stimulation and

TABLE 1 (Experiment A).—*Immediate Treatment by Electrical Stimulation (Galvanic Current, Ten Contractions Daily)*

Sciatic nerve sectioned bilaterally and sutured immediately. Period of treatment six weeks.

Monkey No.	Left Side (treated) (Gm.)	Right Side (control) (Gm.)	Difference (Gm.)
15	11.88	12.66	0.78 more atrophy on treated side
16	10.90	11.77	0.87 more atrophy on treated side

TABLE 2 (Experiment B).—*Treatment Started After Two Weeks of Rest (Period of Treatment Four Weeks)*

Sciatic nerve of left lower extremity severed and sutured immediately. Right side normal control.

Treatment	Monkey No.	Weight Paralyzed Muscles, Gm.	Weight Control Muscles, Gm.	Weight Loss, Gm.	Atrophy, %
Electrical stimulation (10 contractions)	17	8.68	19.24	10.56	54.88
	18	8.48	19.24	10.80	56.01
Massage and passive movement	19	7.47	17.17	9.70	56.49
	20	10.26	21.60	11.34	52.50
Rest (immobilization in cast)	21	12.30	25.79	13.49	52.50

also massage and passive movement, and the fourth group was kept immobilized in the plaster cast in a state of continuous and prolonged rest. After two months of treatment (three months following nerve section and suture) the gastrocnemius-soleus muscles were removed and weighed. The results are seen in table 3.

A similar experiment was carried out on another group of animals; the period of treatment, however, was longer (five months). Treatment was begun after four weeks rest, during which time the paralyzed muscles were splinted and protected in a plaster cast.

A final experiment was conducted, treatment being started immediately following nerve section and suture

TABLE 3 (Experiment C).—*Treatment Started After Four Weeks' Rest (Period of Treatment Two Months)*

Left sciatic nerve severed and sutured immediately. Right side normal control.

Treatment	Monkey No.	Weight Paralyzed Muscles, Gm.	Weight Control Muscles, Gm.	Difference, Gm.	Atrophy, %
Electrical stimulation	22	10.81	21.09	10.28	48.7
	23	9.08	25.76	16.68	64.7
Massage and passive movement	24	11.93	15.82	3.89	24.5
	25	13.12	17.34	4.22	24.3
Combined electrical stimulation and massage and passive movement	26	11.032	19.260	8.22	42.7
	27	7.945	16.365	8.42	51.3
Immobilization in plaster cast	28	6.925	16.456	9.531	57.9

TABLE 4 (Experiment D).—*Treatment Begun After Four Weeks' Rest (Period of Treatment Five Months)*

Left sciatic nerve severed and sutured immediately. Right side normal control.

Treatment	Monkey No.	Weight Paralyzed Muscles, Gm.	Weight Control Muscles, Gm.	Difference, Gm.	Atrophy, %
Electrical stimulation	29	13.53	32.63	19.10	58.5
	30	17.85	25.97	8.12	31.2
	31	9.97	19.63	9.66	44.1
Massage and passive movement	32	17.25	19.28	2.03	10.5
	33	20.42	25.10	4.68	18.6
Immobilization in plaster cast	34	7.64	19.45	11.81	60.7
	35	4.90	12.09	7.10	58.7

without allowing a rest period of four weeks before beginning treatment, as was the condition in the previous two experiments. An additional group of animals was included, these monkeys receiving no supervised treatment whatever following the nerve section and suture. They were kept in cages during the six months course of the experiment and were examined weekly as to the appearance of voluntary movement and return of faradic response. The treatment period in this experiment was for six months. All casts were removed at the end of five months so as to permit active movements of the recovering muscles. The results may be seen in table 5.

The results of this experiment are in accord with the two previous ones. The best restoration of muscle bulk was obtained in two groups, one of which received massage and passive movement therapy and the other no supervised treatment. The poorest response was in the group of animals immobilized in plaster casts with no additional treatment.

COMMENT

Our studies indicate that atrophy and degeneration of denervated skeletal muscle are just as inevitable as are the changes which occur in the peripheral portion of a severed nerve. We have shown that no form of physical therapy prevents atrophy up to a period of six weeks.

From a clinical point of view, atrophy has been the feature receiving most attention by many in dealing with paralyzed muscles of the flaccid type. As already noted, the qualitative changes in the paralyzed muscles, rather than the quantitative loss of bulk, determines in great measure the type of response to therapy that can be expected when the regenerated nerve again

innervates the paralyzed muscle. Microscopic studies [5] show that, associated with atrophy and degeneration of denervated muscle, reparative and regenerative phenomena go hand in hand. The striking increase in sarcolemmal and muscle nuclei is the first evidence of this reaction. After the degeneration of the muscle cells, however, fibrosis soon follows. This response of fibrous tissue cells, derived in part from the sarcolemmal nuclei and from the degenerated muscle, occurs insidiously. Microscopic studies show that by six weeks, at which time there is evidence of longitudinal splitting within the degenerating muscle fibers, fibrosis makes its appearance. It is not prominent, however, until the later stages.

TABLE 5 (Experiment E).—*Six Months' Treatment; No Preliminary Rest*

Treatment	Monkey No.	Weight Paralyzed Muscles, Gm.	Weight Control Muscles, Gm.	Difference, Gm.	Atrophy, %
Electrical stimulation	36	15.08	35.05	19.93	56.92
	37	16.315	35.70	19.385	54.29
Passive movement and massage	38	15.00	23.70	8.70	36.7
	39	27.21	42.41	15.20	35.85
Combined electrical stimulation and massage and passive movement	40	21.11	44.75	23.64	52.82
	41	died			
Immobilization in plaster cast	42	14.22	42.11	27.89	66.24
	43	15.79	40.49	24.70	61.00
"No treatment"	44	27.64	41.24	13.60	32.97
	45	29-71	45.52	15.81	34.73

The excessive invasion of the damaged muscle by fibrous tissue not only replaces the muscle fibers which have undergone degeneration but also exerts a damaging effect on the remaining parenchyma by compression and "cirrhosis." Excessive fibrosis interferes with the circulation in the muscle and also retards the regeneration of muscle fibers. Since muscle regenerates by outgrowth from the healthy stumps of partially degenerated muscle cells, the importance of preserving the parenchyma is obvious.

It is commonly emphasized throughout the literature on the treatment of flaccid paralysis that the condition of the remaining muscle is the important factor in determining the degree of muscle repair and recovery which follows the regeneration of the peripheral nerve. The process of muscle atrophy and degeneration, however, progresses despite attempts at early therapy. Treatment does influence the quality of the denervated muscle (1) by aiding the circulation and (2) by minimizing fibrosis.

5. Chor, Herman; Dolkart, R. E., and Davenport, H. A.: Chemical and Histological Changes in Denervated Muscle of the Monkey and Cat, Am. J. Physiol. **118:** 580 (March) 1937.

It may be seen from the present experiments that each type of therapy resulted in a rather clearcut response on the part of the regenerating muscle. In experiment D, the best restoration of muscle bulk occurred in the group of animals which received massage and passive movement therapy. A recovery of 81.4 per cent (18.6 per cent atrophy) and 89.5 per cent (10.5 per cent atrophy) after six months clearly supports this conclusion. In experiment E it may be noted that the best results were obtained in two groups, one receiving massage and passive movement and the other receiving "no treatment." In each instance a recovery of approximately 65 per cent (35 per cent atrophy) was obtained. It should be noted that the group which received "no treatment" were kept in small cages which minimized stretching of the paralyzed muscle and yet permitted some degree of motion equivalent to passive movement.

The poorest results were obtained in those animals in which the paralyzed limb was kept in complete and prolonged immobilization by means of a plaster cast. This was a constant finding in all the experiments. Its explanation is obvious. Grossly there was marked fibrosis and ankylosis at the ankle and knee joints. The gastrocnemius-soleus muscles were surrounded by thickened septums of fibrous tissue, and throughout the pale muscles were whitish and yellowish streaks—cords of dense fibrous tissue. Microscopically this fibrosis was clearly demonstrable both surrounding and within the muscle fibers. Such a state of "cirrhosis" of the muscle hinders the restorative process.

The results of therapy by electrical stimulation suggest that this form of treatment does not give as good a restoration of the bulk of regenerating muscle as may be obtained by massage and passive movement. Further studies correlating the restoration of muscle bulk with muscle function are needed in order to establish more definitely the effects of these therapeutic measures.

TABLE 6.—*Correlation of Muscle Restoration with Nerve Regeneration*

Three Months After Sciatic Nerve Section and Suture (4 Weeks Rest In Cast Before Beginning Treatment)

Treatment	Monkey No.	Muscle Atrophy	Regenerated Sciatic Nerve Fibers: Total	Regenerated Sciatic Nerve Fibers: Myelinated	Regenerated Branches to Gastrocnemius-Soleus Muscles: Total	Regenerated Branches to Gastrocnemius-Soleus Muscles: Myelinated	Maturity of Fibers	Return of Voluntary Movement (No. of Days)	Return of Faradic Response (No. of Days)
Electrical stimulation	22	49%	55,000	25,000	8,744	3,600	Mature	73	80
	23	65%	60,000	22,000	5,500	868	Immature	None at 90 days	None at 90 days
Massage and passive movement	24	25%	62,000	19,000	7,700	2,500	Mature	55	79
	25	24%	65,000	15,000	4,287	2,000	Medium Mature	None	None
Immobilization	28	58%	58,000	22,000	10,000	2,200	Mature	None	None
Combined electrical stimulation and massage and passive movement	26	43%	51,000	23,000	.....	3,500	Mature	70	80
	27	51%	94,000	24,000	10,000	2,800	Medium Mature	None	None
			Average 60,000						

Total fibers in normal sciatic approximately 100,000; myelinated, 35,000.

A noteworthy finding was the uniformly better results obtained in the animals which were permitted a preliminary period of rest of four weeks (the paralyzed muscles supported in a neutral position by plaster casts) before treatment was instituted. The results support the clinical impression that rest is indicated in the early stage of lower motor neuron paralysis.

CORRELATION OF MUSCLE RESTORATION WITH NERVE REGENERATION

A study of the regenerated nerves to the gastrocnemius-soleus muscles was made to determine whether or not there is any correlation between regeneration of muscle and regeneration of nerve. It was found that

at the end of three months 60 per cent of the normal number of fibers of the sciatic nerve made their appearance in the regenerating distal portion.[6] Of these there were twice as many unmyelinated as myelinated fibers. In table 6 the number of regenerated nerve fibers are listed along with the percentage of atrophy of the gastrocnemius-soleus muscles grouped according to the type of physical therapy employed.

TABLE 7.—*Correlation of Muscle Restoration with Nerve Regeneration*

Six months after sciatic nerve section and suture
(four weeks rest before treatment)

Treatment	Monkey	Atrophy	Regenerated Sciatic Nerve Fibers: Total	Regenerated Sciatic Nerve Fibers: Myelinated	Return of Voluntary Movement (No. of Days)	Return of Faradic Response (No. of Days)
Electrical stimulation	29	59%	69,000	22,000	158	152
	30	31%	76,000	33,500	158	152
	31	44%	.....	33,000	103	152
Passive movement and massage	32	11%	90,000	.....	92	87
	33	19%	90,000	36,000	76	87
Immobilization	34	61%	85,000	19,000	None	None
	35	59%	102,000	28,000	None	None
			Average 84,000			

Total fibers in normal sciatic, 100,000; myelinated, 35,000.

The total number of regenerated fibers in the distal portion of the operated sciatic nerve varied between 51,000 and 94,000, with an average of approximately 60,000. In monkey 25, in which the best restoration of muscle occurred, 24 per cent atrophy, there were 65,000 regenerated fibers, whereas in monkey 23, in which the poorest restoration occurred, 65 per cent atrophy, there were 60,000 regenerated fibers. There appears to be no definite correlation between the total number of regenerated fibers of the sciatic nerve and restoration of the gastrocnemius-soleus muscles. The number of myelinated fibers in the regenerated nerve was fairly constant throughout the series and it may be concluded that the degree of myelination of the fibers likewise is not directly related to the restoration of muscle.

The total number of regenerated fibers in the branches of the nerve going directly to the gastrocnemius muscles varied from 4,287 to 10,000. Here also there is no correlation between nerve regeneration and muscle restoration.

After six months the number of regenerated nerve fibers reaches 80 per cent of the normal.[7] Therefore, three times as many regrew in the first three months period as the number added during the second three months period. The process of myelination seems to keep pace with the regrowth of axis cylinders. In table 7 the number of regenerated sciatic nerve fibers found six months after nerve section and suture is compared with the restoration of muscle in each instance.

The number of regenerated fibers in the sciatic nerve varied between 69,000 and 102,000, with an average of approximately 84,000. There is no direct correlation between the number of regenerated fibers and the restoration of muscle. The number of myelinated fibers was approximately one third of the total—the same ratio found after three months' regeneration. In this series the poorest myelinization occurred in monkey 34, in which the poorest restoration of muscle was found. In the monkeys with good muscle recovery, myelinization of the regenerative fibers was correspondingly good.

In the third group of monkeys, nerve fiber counts were made of the regenerated branches to the gastrocnemius muscles. A considerable variation in total number of fibers was found. This is true also in the normal, in which the total number of fibers varied from 11,000 to 21,000. In this group there is no definite correlation between the number of regenerated nerve fibers and restoration of muscle, but it would appear that for regeneration of muscle a minimal number of regenerated nerve fibers must be present.

There was considerable variation in the number of days following nerve section and suture at which voluntary movement returned. In each experiment the earliest recovery was found in those animals which received massage and passive exercise. The poorest functional recovery was in the animals treated by prolonged immobilization in plaster casts. The fibrosis in the muscle and about the joints and ligaments may interfere with movement of the muscle despite the apparently good regeneration of the nerve. The return of motor function was found to vary considerably, as early as fifty-five days in monkey 24 and as late as 158 days in others. No return of voluntary movement was noted in several of the animals immobilized in plaster casts for six months.

The return of faradic response likewise was very inconstant and no conclusions can be drawn from the data on hand. There is a definite need for further study to correlate the return of function with the restoration of muscle and nerve.

CONCLUSIONS

1. Atrophy and degeneration of denervated muscle progress up to a period of at least six weeks despite treatment by passive movement and massage or by electrical stimulation.

TABLE 8.—*Correlation of Muscle Restoration with Nerve Regeneration*

Six months after sciatic nerve section and suture
(no rest preceeding treatment)

Treatment	Monkey No.	Regenerated Branches to Gastrocnemius-Soleus Muscle: Muscle Atrophy	Regenerated Branches to Gastrocnemius-Soleus Muscle: Total No. of Fibers	Regenerated Branches to Gastrocnemius-Soleus Muscle: Maturity of Fibers	Return of Voluntary Movement (No. of Days)	Return of Faradic Response (No. of Days)
Electrical stimulation	36	57%	11,170	Mature	122	105
	37	54%	5,920	Immature	118	112
Passive movement and massage	38	37%	8,120	Mature	95	105
	39	36%	8,360	Medium Mature	96	105
Immobilization	42	66%	12,480	Immature	146	No response
	43	61%	8,340	Medium	146	105
Combined electrical stimulation and passive movement and massage	40	53%	11,780	Immature	120	105
	41	Died				
No treatment	44	33%	5,800	Medium	132	105
	45	35%	8,050	Medium Mature	132	105

Total fibers in normal varied from 11,000 to 21,000

2. Regeneration and restoration of skeletal muscle, previously denervated, occurs with reinnervation. Unless hindered by excessive fibrosis (prolonged immobilization) or damage to the muscle parenchyma, a good recovery of muscle bulk can be expected.

3. Regeneration of the peripheral nerve occurs at a fairly constant rate. At the end of three months the number of regenerated fibers reaches 60 per cent of the normal. At the end of six months, regeneration of the nerve fibers reaches 80 per cent.

6. Davenport, H. A.; Chor, Herman, and Cleveland, D.: Fiber Ratios in Regenerating Nerves: II. The Status of Regrowth of the Sciatic and Nerves to the Gastrocnemius in Macacus Three Months After Section, J. Comp. Neurol. **70**: 153 (Feb.) 1939.

7. Davenport, H. A.; Chor, Herman, and Dolkart, R. E.: The Ratio of Myelinated to Unmyelinated Fibers in Regenerated Sciatic Nerves of Macacus Rhesus, J. Comp. Neurol. **67**: 483 (Oct.) 1937.

4. The degree of regeneration of the peripheral nerve is not (actually) influenced by the use of physical therapy measures.

5. There is no direct correlation between the number of regenerated nerve fibers and the restoration of muscle. It would appear, however, that for regeneration of muscle a minimal number of regenerated nerve fibers must be present.

6. The condition of the remaining muscle is the important factor in determining the degree of muscle repair and recovery which follows the regeneration of the peripheral nerve. In the restoration of muscle, physical therapy is of value. Massage and passive movement therapy appear to be the most beneficial. A preliminary rest period of four weeks before treatment gives uniformly better results than obtained when treatment is given immediately following nerve section and suture. During this rest period the paralyzed muscles should be splinted in neutral position.

7. Further studies are needed to correlate the restoration of function with the return of muscle bulk in order to establish more definitely the effects of physical therapy measures.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

OXYGEN.—"Oxygen contains not less than 99 per cent by volume of O. For convenience it is supplied in compressed form in metallic cylinders." *U. S. P.*

Actions and Uses.—Oxygen is administered for the purpose of relieving difficult respiration in cases of mechanical hindrance to the ingress of air to the lungs and in the treatment of carbon monoxide poisoning. It is also mixed with nitrogen monoxide when this gas is used as an anesthetic. Oxygen containing from 5 to 7 per cent of carbon dioxide is useful for resuscitation.

OXYGEN-CARBON DIOXIDE MIXTURE.—A mixture in various proportions of carbon dioxide and oxygen.

For standards see U. S. Pharmacopeia under Carbonei Dioxidum and Oxygenium.

Caution: The usual precautions concerning use of oxygen apparatus must be followed. Special precaution must be observed against use of oil on valves.

Actions and Uses.—Oxygen-carbon dioxide mixture in varying proportions for supplying artificial respiration and as a stimulant to the respiratory center.

Manufactured by the Denver Oxygen Company, Denver, Colorado. No U. S. patent or trademark.

Oxygen-Carbon Dioxide Mixture, Carbon Dioxide 5%; Oxygen 95%.
Oxygen-Carbon Dioxide Mixture, Carbon Dioxide 7%; Oxygen 93%.
Oxygen-Carbon Dioxide Mixture, Carbon Dioxide 10%; Oxygen 90%.

FUADIN.—Stibophen.—Sodium-Antimony III bis-catechol-2,4 disulfonate of sodium $[(NaO_3S)_2C_6H_2(O)_2 : Sb.OC_6H_2ONa.(SO_3Na)_2].7H_2O$. It contains 13.6 per cent of trivalent antimony.

Actions and Uses.—Fuadin is proposed for use in the treatment of granuloma venereum and of schistosomiasis (bilharziasis). Its action is reported to be more rapid and efficient in early granuloma venereum than in the later stages when there is scar formation. It is necessary to keep the treatment up for some time after all evidence of the disease has disappeared. In schistosomiasis it is indicated together with iron as the treatment of choice in the intestinal stage of the disease. The iron salts should be given after the completion of the treatment and not concurrently. The anemia, when present, is apparently due to a prolonged iron deficiency.

Dosage.—Intramuscularly (rarely intravenously), first day 1.5 cc., second day 3.5 cc., and on the third, fifth, seventh, ninth, eleventh, thirteenth and fifteenth days 5 cc., a total of 40 cc. of the 6.3 per cent solution. Following healing in a week or two weeks the course may be repeated and thereafter the drug is given once a week and then every fourteen days for several weeks to prevent relapse.

Manufactured by Winthrop Chemical Co., Inc., New York. U. S. patent 1,549,154 (Aug. 11, 1925; expires 1942) and 1,873,668 (Aug. 23, 1932; expires 1949). U. S. trademark 304,950.

Ampoules Solution Fuadin, 3.5 cc.: Each ampule contains fuadin 0.22 Gm. (3½ grains); sodium bisulfite, not more than 0.125 per cent.

Ampoules Solution Fuadin, 5 cc.: Each ampule contains fuadin 0.32 Gm. (5 grains); sodium bisulfite, not more than 0.125 per cent.

Fuadin is supplied only in an approximately 6.3 per cent solution with not more than 0.125 per cent sodium bisulfite as a preservative. The solution is clear, odorless and nearly colorless; it possesses a slightly saline taste and acquires a faint pink color on standing in the light. The specific gravity of fuadin solution is not less than 1.037 nor more than 1.041 at 25 C.

To 2 cc. of solution add 0.5 cc. of diluted hydrochloric acid, 10 cc. of distilled water and 1 cc. of sodium sulfide solution: a reddish orange precipitate appears. Dilute 1 drop of fuadin solution to 3 cc. and add one drop of ferric chloride solution: a deep bluish green color appears, which turns brownish red on the addition of ammonia water. To one drop of the solution add 1 cc. of distilled water and one drop of mercurous nitrate solution: a black precipitate appears.

To 1 cc. of fuadin solution, add 2 cc. of a solution of magnesium uranyl acetate: a yellow crystalline precipitate appears. To 1 cc. of the solution add 2 drops of diluted nitric acid and 2 drops of silver nitrate solution: no opalescence is produced immediately *(chloride)*.

To 2 cc. of fuadin solution add 20 cc. of bromine water and 1 cc. of diluted hydrochloric acid; expel the bromine by boiling and add 1 cc. of ammonium thiocyanate solution: no red color appears *(iron)*. To 2 cc. of fuadin solution add 1 cc. of ammonium hydroxide and 2 drops of ammonium oxalate solution: no precipitate appears *(calcium)*.

To 2 cc. of fuadin solution in a glass stoppered flask, add 2 cc. of diluted acetic acid and 0.6 cc. of formaldehyde solution and allow to stand five minutes. Add an excess of fiftieth-normal iodine solution and, after five minutes, titrate the excess with fiftieth-normal sodium thiosulfate, using a 1 per cent starch solution as indicator: the trivalent antimony content is not less than 0.81 nor more than 0.88 Gm. per hundred cubic centimeters.

Transfer 5 cc. of fuadin solution to a 250 cc. beaker and add 18 cc. of diluted hydrochloric acid and 32 cc. of water. Evaporate the solution to about 5 cc. and neutralize with sodium hydroxide solution. Transfer to a nickel crucible, evaporate to dryness and add 3 Gm. of sodium hydroxide containing 5 per cent potassium nitrate. Fuse the mixture and heat until it is free from organic matter and dissolve the cooled melt in 100 cc. of water. Acidify the solution with diluted hydrochloric acid, add 1 Gm. of tartaric acid, filter, and precipitate the sulfates by adding 5 cc. of a 10 per cent barium chloride solution. Digest on a steam bath for at least three hours, filter on a Gooch crucible, ignite and weigh: the sulfur content is not less than 0.847 and not more than 0.950 Gm. per hundred cubic centimeters.

BISMUTH SUBSALICYLATE (See New and Nonofficial Remedies, 1939, p. 141).

The following dosage forms have been accepted:

Bismuth Subsalicylate in Oil (Gilliland), 0.13 Gm. (2 grains) per cc.: A suspension of bismuth subsalicylate in vegetable oil containing in each cubic centimeter 0.13 Gm. (2 grains) of bismuth subsalicylate U. S. P. with 3 per cent of chlorobutanol added. Marketed in vials containing 15 cc., 30 cc., 60 cc. and 120 cc. and in bottles containing 480 cc.

Prepared by Gilliland Laboratories, Inc., Marietta, Pa. No U. S. patent or trademark.

Bismuth Subsalicylate in Oil (Gilliland), 0.2 Gm. (3 grains) per cc.: A suspension of bismuth subsalicylate U. S. P. in vegetable oil containing in each cubic centimeter 0.2 Gm. (3 grains) of bismuth subsalicylate with 3 per cent of chlorobutanol added. Marketed in vials containing 15 cc., 30 cc., 60 cc. and 120 cc. and in bottles containing 480 cc.

Prepared by Gilliland Laboratories, Inc., Marietta, Pa. No U. S. patent or trademark.

DIGITALIS (See New and Nonofficial Remedies, 1939, p. 183).

The following dosage forms have been accepted:

Capsules Digitalis Powder, 1 grain (⅔ U. S. P. Digitalis Unit): Dispensed in blue capsules.

Prepared by The Maltbie Chemical Company, Newark, N. J.

Capsules Digitalis Powder, 1½ grains (1 U. S. P. Digitalis Unit): Dispensed in blue capsules.

Prepared by The Maltbie Chemical Company, Newark, N. J.

SULFARSPHENAMINE-MALLINCKRODT (See New and Nonofficial Remedies, 1939, p. 100).

The following dosage forms have been accepted:

Sulfarsphenamine-Mallinckrodt, 0.9 Gm. Ampoules.
Sulfarsphenamine-Mallinckrodt, 3.0 Gm. Ampoules.

RABIES VACCINE (See New and Nonofficial Remedies, 1939, p. 414).

The Gilliland Laboratories, Inc., Marietta, Pa.

Rabies Vaccine-Gilliland (Modified Semple Method).—An antirabic vaccine that differs from Rabies Vaccine-Gilliland (Semple Method) in the concentration of virus, in the period of inactivation and in the dose to be administered. The vaccine consists of brain and cord tissue removed from rabbits killed after being completely paralyzed following an inoculation of fixed rabies virus. The brains and cords are emulsified in the presence of a 1 per cent phenolized physiologic solution of sodium chloride to make a 40 per cent emulsion. The mixture is incubated at 36.5 C. for a sufficient time to inactivate the virus. The usual safety tests are applied on the 40 per cent virus tissue emulsion. The product is then further diluted, after completion of safety tests, with an equal volume of physiologic solution of sodium chloride so as to contain 20 per cent of the brain and cord substance. Marketed in packages of fourteen vials, each containing 0.5 cc.

Dosage.—The content of a syringe or vial is administered daily over a period of fourteen days.

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SATURDAY, SEPTEMBER 9, 1939

TIN, TAPEWORMS AND TUSH

Recently physicians have received a circular recommending the use of a tin compound called Stannoxyl as a teniafuge. The circular, entitled "Exit Tapeworm," was circulated by the Anglo-French Drug Co., Inc., New York City, and promised "Tapeworms Expelled Without Fasting or Purging." Stannoxyl is also recommended for the treatment of "boils and styes," and has been so advertised by the firm for some time. Published evidence to sustain these contentions is not available either in amount or in quality.[1] Kolmer and Harkins[2] have reported on "Stannoxyl in the Chemotherapy of Experimental Staphylococcus Infections." They concluded that the drug was of low toxicity in rats and rabbits by oral and intramuscular administration but was without demonstrable therapeutic effect on experimental subcutaneous abscesses of guinea pigs and without similar effect on abscesses of the internal organs of rabbits. A further note by Kolmer, Brown and Harkins[3] on tin compounds in the chemotherapy of experimental staphylococcic infections confirmed their earlier views.

Now Stannoxyl is recommended as a teniafuge, in addition to its use "for boils and styes." In the circular the firm states that "Numerous Canadian and French physicians have used Stannoxyl, the original combination of metallic tin and tin oxide, and report that it seldom fails to expel Tenia Saginata within twenty-four hours." The *Quarterly Cumulative Index Medicus* reveals only one such report by Lepinay,[4] a veterinarian, describing the use of tin salts as a teniafuge for teniasis in dogs. He reports only one case of its use in a human being. After recounting the difficulty of determining whether or not the heads of the worms had been passed by either the dogs or the human being, he concludes with a statement (translated): "The salts of tin appear to be a treatment of choice for teniasis as much from the point of view of rapidity of action as from the ease of absorption." Such a conclusion is obviously unwarranted on the basis of the evidence presented. No bibliography is appended to the report.

Yet in the circular concerning Stannoxyl the firm states that "The discovery of its specific value for tapeworms was made accidentally by Lepinay in 1933. . . . He observed that many of his patients, while taking Stannoxyl Tablets for boils, passed tapeworms during the course of the treatment." Apparently the firm draws no distinction between dogs and man in speaking of a veterinarian's patients. Actually Lepinay reported success in expulsion of the tenia from one human being in the course of two days' treatment, whereas the firm claims that Stannoxyl was reported to fail seldom in the expulsion of Taenia saginata within twenty-four hours. The firm uses only the one reference, for the good reason that there appear to be no others on this subject in the literature. Even this might be excusable if the report constituted scientific evidence and was cited accurately, without gross oversight of the facts.

1. Stucco Boils—Stannoxyl, Queries and Minor Notes, J. A. M. A. **91**: 1738 (Dec. 1) 1928.
2. Kolmer, J. A., and Harkins, M. J.: J. Chemotherapy **8**: 6 (April) 1931.
3. Kolmer, J. A.; Brown, Herman, and Harkins, M. J.: J. Pharmacol. & Exper. Therap. **43**: 515 (Nov.) 1931.
4. Lepinay, L.: A New Teniafuge, Rev. de path. comparée **33**: 545 (April) 1933.

TRANSPLANTATION OF ADRENAL CORTEX FOR ADDISON'S DISEASE

The feasibility of successful transplantation of the adrenal gland in animals has been demonstrated by a number of investigators. The rat, according to Jaffe,[1] offers excellent opportunities for such a study. In his experience successful transplants were obtained in at least 80 per cent of attempts. The process of regeneration was completed in from three to four weeks, after which time the transplant grew and reached the size of a normal gland. Jaffe and Plavska's autoplastic transplants in guinea pigs maintained their animals for months after the removal of the second main gland. These results appear to be conclusive of function when the results are compared with the results for guinea pigs whose adrenals were removed and in which transplants were not done; these survived three or four days. Elliott and Tuckett[2] observed that the subcutaneous tissues of guinea pigs are peculiarly sensitive to adrenal grafts, which produce in them edema and hemorrhagic dissolution. Their investigations proved that the irritant substance occurs entirely in the medulla of the gland. However, even in this animal, if only the cortex is transplanted, a large percentage of takes is obtained. Jaffe and Plavska found that by separating the cortex from the medulla and dividing the cortex into small fragments and washing them thoroughly in sterile physiologic solution of sodium chloride it was possible to

1. Jaffe, H. L.: The Suprarenal Gland, Arch. Path. & Lab. Med. **3**: 414 (March) 1927.
2. Elliott, T. R., and Tuckett, I.: Cortex and Medulla in the Suprarenal Glands, J. Physiol. **34**: 332, 1906.

transplant these into the rectus muscle of the guinea pig and obtain a high percentage of takes.

The same authors found in sixty-three of sixty-seven rats in which the transplants were large and well vascularized and in which necropsy showed the absence of accessories that the animals approached the normal litter and sex controls in weight and activity and withstood doses of vaccine that invariably killed adrenalectomized rats that had not received transplants.

In 1922 Hurst, Tanner and Osman [3] reported a case of a male who presented himself with a typical picture of advanced Addison's disease. Administration of large doses of adrenal extracts and of hydrochloric acid by mouth and the injection of 1 : 1,000 epinephrine did not cause any obvious improvement. An adrenal gland removed from a man who had just died was grafted into the subcutaneous tissues in the inguinal region of the patient. Two weeks later an adrenal removed from a fetus just after death was grafted into the recipient's left testicle. There was slow improvement and a rise in blood pressure from 75 to 95. Nine months later the patient felt well. His systolic blood pressure had risen to 115.

Currie [4] in 1924 transplanted an adrenal gland of a sheep into an abdominal incision of a moribund patient. Four days later the patient was better, the blood pressure having risen from 70 to 110. Nine days later the transplant showed signs of suppuration and the patient relapsed. A second transplantation of both adrenals of a sheep was performed the following day. The adrenals were cut into fine strips, washed in warm saline solution and placed in the barrel of a 10 cc. syringe with a wide bone needle. The needle was inserted into the subcutaneous tissues of the patient on each side of the abdomen and the tissues forced out as the needle was withdrawn. Two months later the patient was much improved and her blood pressure was 100/75. Reinhart [5] transplanted in 1928 the adrenal taken from a patient with tuberculosis of the kidney at the time of operation into the abdominal wall of a patient in an advanced stage of Addison's disease. There was an immediate improvement, the blood pressure gradually rising from 85 to 125. The patient was apparently in good condition six months after the transplantation. The author emphasized two interesting facts: a marked scaling of the skin and the onset of menstruation eight days after the transplantation in a patient who had had amenorrhea for a long time. Frank d'Abreu [6] in 1933 transplanted into a patient presenting symptoms of advanced Addison's disease adrenal glands from a patient who had just died. The patient's systolic blood pressure rose from 40 to 76 in the course of the next few days. Eleven days after the first transplant an adrenal gland of a recently dead newborn infant was transplanted into the abdominal wall of the patient. There was but little improvement, the patient dying nine days later. Postmortem revealed that both grafts had suppurated.

The fact that the medulla of the gland was responsible for the rapid necrosis and suppuration was apparently not appreciated by the clinicians. Beer and Oppenheimer [7] were first, in 1934, to transplant the adrenal cortex alone. They removed the adrenal from a patient in the course of an operation on the kidney, stripped it of the medulla and implanted it in small pieces into avascular pockets made in the recipient's rectus muscle. Their first patient showed temporary improvement but died fourteen days later of a progressive infection starting in a bed sore. The microscopic examination demonstrated that the bits of adrenal cortical transplants maintained their structure and were apparently viable. A rather striking success was obtained in the second patient, in whom transplantation was made while he was in a state of stupor. A few weeks later a second transplantation was performed. This patient apparently made a complete recovery. The authors suggest the combined use of adrenal cortical transplantation and of Collip's adrenotropic fraction of anterior pituitary gland extract to stimulate the transplant and whatever viable adrenal rests the host may possess.

Auslender [8] reports fourteen cases of Addison's disease in which heterotransplants were employed. The adrenal was removed immediately on the killing of the animal at the abattoir, and the cortex was dissected from the medulla in the operating room. Fragments of the cortex were implanted in the subcutaneous tissues of the abdomen. The immediate results were excellent in all fourteen cases, an increase occurring in weight, muscle power, blood pressure, blood cholesterol and blood sugar. Nausea, vomiting, diarrhea and achylia disappeared. More or less permanent results were obtained in the mild cases. The longest case was observed for a year and eight months. In a few cases the improvement was progressive. In the severe cases the improvement lasted from five to six months, after which there was a gradual return of the symptoms, necessitating a second transplantation in from nine to twelve months. The results after the second transplantation were equally good.

In view of the outlook in Addison's disease and the frequent failure of replacement therapy, the homotransplantation and heterotransplantation of the adrenal cortex seem to offer some hope of amelioration and to justify further trial.

3. Hurst, A. F.; Tanner, M. S., and Osman, A. A.: Proc. Roy. Soc. Med. **15**: 19, 1921-1922.

4. Currie, Morley: Report of a Case of Addison's Disease Treated with Benefit by a Suprarenal Transplant, Canad. M. A. J. **14**: 626 (July) 1924.

5. Reinhart, L.: Mitteilung über Nebennierenimplantation bei Addisonscher Erkrankung, München. med. Wchnschr. **24**: 1027, 1928.

6. d'Abreu, Frank: Transplantation of Suprarenal Glands in Addison's Disease, Lancet **2**: 1478 (Dec. 30) 1933.

7. Beer, Edwin, and Oppenheimer, B. S.: Transplantation of the Adrenal Cortex for Addison's Disease, Ann. Surg. **100**: 689 (Oct.) 1934.

8. Auslender, E. M.: Immediate and Late Results of Transplantation of the Suprarenal Cortex in Fourteen Cases of Addison's Disease, Novy khir. arkhiv. **42**: 375, 1938.

Current Comment

WEATHER CONDITIONS AND ASTHMA

The possibilities of experimental meteorobiologic research are well illustrated by Preuner's [1] report of the effect of weather conditions on experimental asthma in guinea pigs. The earlier methods of producing anaphylactic shock in guinea pigs produced allergic syndromes and sequelae rarely encountered in human medicine. Most immunologists were skeptical therefore of the clinical applicability of conclusions drawn from animal experimentation. Alexander [2] and others demonstrated, however, that a symptom complex identical with that of human asthma can be produced in this animal species by allowing highly sensitized guinea pigs to breath "vaporized antigens," i. e. invisible sprays of foreign proteins. Apparatus for the administration of such antigenic "vapors" were subsequently perfected by European investigators.[3] Guinea pigs previously sensitized by a single intraperitoneal injection with 0.1 cc. of egg white, for example, were allowed to breath a fine egg albumin "vapor," the apparatus being adjusted so that each invisible spray droplet was less than 5 microns in diameter. Coarser sprays were found to be less effective. Distinct asthmatic symptoms are usually noted within two minutes after the beginning of this "vaporization" test, increasing in severity till the tenth minute. If death results, the animals exhibit at necropsy the classic appearances of acute anaphylactic shock. By varying the richness of the spray and by recording from minute to minute the severity of the asthmatic attack and using a sufficiently larger group of animals, a statistically reliable mathematical expression of the average group severity was found possible. Thus, in one group of eight guinea pigs tested by a low vapor concentration a borderline asthmatic reaction (grade 1.5) was noted during the second minute, increasing to grade 2.9 by the fourth minute, with grade 3.3 symptoms by the end of eight minutes. Beginning clonic convulsions (grade 4) were noted in two guinea pigs of this series. Preuner found that lethal asthma (grade 6) was not produced by the dilute spray selected from this group. On convalescence from the asthmatic attack, guinea pigs are found not to have been desensitized and to react over and over with the same mathematical index. Applying this statistical index to large groups of animals, Preuner found that the statistical severity of "vapor" asthma is not dependent on such meteorological factors as temperature, humidity or atmospheric pressure as long as these factors remain constant on the day of the experiment. During periods of rapid changes in weather conditions, however, the average severity is increased about 50 per cent. Thus, in one group of animals tested and retested over a long period the average severity on a dilute spray mixture was only 1.5 on calm days, increasing to an average of 2.2 on days of rapid meteorological change. While this result would seem to be merely confirmation of a popular clinical belief, the fact that meteorological factors are thus subject to accurate statistical study in laboratory animals is of basic scientific interest. The new field of experimental meteorobiology may conceivably assume an important role in future therapeutic study.

1. Preuner, R.: Ztschr. f. Hyg. u. Infektionskr. **121,** May 1939.
2. Alexander, H. L.; Becke, W. G., and Holman, J. A.: J. Immunol. **11:** 175 (March) 1926.
3. Manteufel, P., and Preuner, R.: Ztschr. f. Immunitätsforsch. **80:** 65 (Nos. 1/2) 1933.

TESTS FOR ATHLETIC EFFICIENCY

Physical fitness and athletic efficiency, according to Abrahams,[1] are by no means the same thing. Fitness he conceives as satisfactory adjustment to one's environment as used in the widest sense. Thus, for example, a man may be fit to climb a mountain and yet unfit for the strain of city life. For practical purposes the comparatively simple methods in common use to estimate the physical efficiency of the healthy athlete are, he believes, probably as satisfactory as the more elaborate investigations, which are after all only extensions of fundamental principles. He presents some interesting observations in the same individuals on the rate of deceleration of the pulse after running varying distances, indicating that delayed deceleration is related to duration of exercise which in some way probably leads to a block of vagus inhibition. Concerning the superathlete, Abrahams' remarks warrant quotation: "It is natural to desire to identify some factor which makes for supremacy; it is only to be expected, however, that any such search will be disappointing. After all, although the objective superiority on the track of the superman (the Olympic champion) over the generally accepted 'first-class' athlete is very striking, numerically considered it amounts to only perhaps 4 per cent. Such a difference, if depending on anatomical conformation making for better leverage, would be outside the range of accurate measurement; furthermore, the difference might be some tiny superiority in muscle chemistry or other biochemical factor. When all is said and done, it is a question of coordination of all the various factors working in harmony. Even so mechanical a structure as a motor engine presents the same problem: the perfect chassis is produced when all the parts concerned in locomotion are exactly right at the right moment. And when, as in the case of the human machine, vital phenomena are added, it is not remarkable that no one outstanding criterion can be identified." Athletic efficiency is usually tested by the response of the circulation to effort or to other factors influencing cardiac acceleration or blood pressure. Every test, Abrahams concludes, involving blood pressure is fallacious because of the emotional factor. The rate of cardiac deceleration, however, after a short intense effort, is a valuable index of athletic fitness. Ordinary tests for the effect of prolonged effort are, however, unpractical and he suggests that running various distances by the same individual and observing the rate of cardiac deceleration furnish a more satisfactory method.

1. Abrahams, Adolphe: Tests for Athletic Efficiency, Lancet **2:** 309 (Aug. 5) 1939.

ORGANIZATION SECTION

LOST PATIENTS FROM AN OUTPATIENT CLINIC

A STUDY IN COOPERATIVENESS OF PATIENTS

HORACE GRAY, M.D., AND MARGARET CURTIS, R.N.
SAN FRANCISCO

In these days of agitation over adequate medical care it is no less than just to insist that, within the economic level locally accepted in outpatient clinics, medical care be both expert (so far as humanly possible in a grade A medical school today) and extremely cheap to the patient (at a generous financial deficit to the university) and by contrast to analyze the willingness of patients to avail themselves of their opportunities. The present evidence is based on outpatients but probably holds also for many private patients.

From this clinic evidence has been published to the effect that (1) among patients with diabetes who missed appointments the proportion of those presumably recoverable but not recovered amounted to the discouraging value of 55 per cent [1] and (2) among patients with obesity treated in the same clinic by the same staff, thus equalizing the personal equation as a factor, the number of patients abandoning treatment within one month was seventy-one, while the later loss for noncooperation was thirty-one, making a total wastage of 102 patients, which was 32 per cent of the 314 records sifted.[2]

TABLE 1.—*Failed Appointments*

	Diabetic	Endocrine	Total
Appointments kept	1,862	977	2,839
Appointments failed	291	186	477
Appointments kept plus failed, total	2,153	1,163	3,316
Appointments failed in percentage of total appointments made	14	16	14

RESULTS OF OBSERVATIONS

In the desire to improve our results it was decided for the calendar year 1938 to pursue our follow-ups systematically at a shorter interval, namely one month. The outcome is examined in this paper.

Follow-Up Steps.—1. When a patient failed to come in, our practice has been as follows: A post card was sent out, giving a new appointment in a week. 2. If the patient did not then return, a second card was sent. 3. If the patient failed to return or report after the two cards, the nurse in the clinic made a home visit. The results of these three steps may now be examined in turn.

Number of Patients Followed Up.—The number of persons who failed to return and therefore were followed up was about equally divided between the two main groups of our patients: diabetes (with or without some obesity) 132, or 52 per cent; endocrine (mostly obesity) 122, or 48 per cent; total 254, or 100 per cent.

Number of Failed Appointments.—Of the total 254 patients, furthermore, nearly half (45 per cent) missed their appointments more than once in the year; i. e., those who failed once were apt to fail repeatedly. Accordingly, taking this larger number of "fails" rather than patients as the major item, we find that the total number was 477 fails. This is divisible as shown in table 1.

Frequency of Failed Appointments per Patient Annually.—Although both disease groups were given appointments at about the same intervals and, according to the preceding paragraphs, contained about equal numbers of patients and also an equal percentages of fails, these figures do not reveal all. In fact the diabetic seemed more careless, averaging 2.2 fails per patient but the endocrine only 1.5 fails per patient (table 2).

These high fails of 2.2 per diabetic patient are due to the fact that, while no obese patient failed more than four times, some diabetic patients failed five, six, or even seven times. This is shown by splitting down the last table into number of patients concerned and frequency of fails per patient; then multiplying the frequency of fails by the number of patients in each column and adding 1×141 plus 2×55 and so on we find the total number of fails and also the percentage frequency in each column for that degree of carelessness (table 3).

Economic Level.—Ponteva [3] found 45 per cent of 266 diabetic patients analyzed who gave up the diet, and the cause was poverty in 47 per cent of these, i. e. 21 per cent of the total; hence the high diabetic death rate in Finland. Similarly in the present series the highest proportion of the failing patients belonged to the lowest economic level C, i. e. 45 per cent of the failing diabetic and 38 per cent of the failing endocrine patients. Curiously enough the lowest proportion was accounted for not by the best economic level (A) but by the middle level (B), both among the diabetic and among the obese.

TABLE 2.—*Failed Appointments Per Patient*

	Diabetic	Endocrine	Total
Fails	291	186	477
Patients	132	122	254
Fails per patient	2.2	1.5	1.9

If we consider the average frequency of fails according to economic class, the results are not clearcut, being worse for level C (as expected) among the obese, but among the diabetic for level B (not C) as shown in table 4.

From the Medical Clinic, Stanford University School of Medicine.
The authors were helped by Mrs. Ena Backus and Mrs. Florence Stevens. Financial support was given by the Diabetic Research Fund contributed by an anonymous donor.

1. Gray, Horace, and Platt, V.: Patients Lost and Found, Hospitals **12**: 79 (July) 1938.

2. Gray, Horace, and Kallenbach, Dorothy E.: Obesity Treatment: Results on 212 Outpatients, J. Am. Dietet. A. **15**: 239 (April) 1939.

3. Ponteva, Eero: Ueber die Resultate der Diabetesbehandlung in Finnland, Acta med. Scandinav., supp. 88, 1938.

Failing Patients Sent Postcards.—The average number of postcards sent out per failing patient may be counted thus: diabetic, 398 to 132 patients, averaging 3 cards each; endocrine, 256 to 122 patients, averaging 2.1 cards each; total, 654 to 254 patients, averaging 2.6 cards each.

The 654 cards may also be divided as follows: returned after one card, 300 patients (300 cards); returned after two cards, eighty-three patients (166 cards); not returned after two cards plus telephone, thirteen patients (twenty-six cards); remainder needing home visits, eighty-one patients, 162.

Proportion of Failed Appointments Recovered by Postcard.—More instructive though more elaborate is the analysis of the proportion of failed appointments made good by postcards. We found that 63 per cent of the fails were remedied by one postcard, another 17 per cent by the second card, 3 per cent accounted for by telephone, and 17 per cent required home visits to get them back (table 5).

Reported (by Telephone) But Didn't Return.—Attempts were made in this way to keep contact with some patients who failed to answer cards, but the number of patients reached was so small (thirteen) that the method appears useless. The results were: moved out of town, two; to other medical care, two; promised to return but failed, nine; recovered, none.

Home Visits.—So we finally had left eighty-one failed appointments needing approach by home visits. This method succeeded in twenty-two out of eighty-one, or 27 per cent. The residual fifty-nine utter losses are shown in table 6 (i. e. 12 per cent of all 477 failed appointments).

TABLE 3.—*Failing Patients and Fails per Patient*

		Frequency of Fails per Patient Annually								
		Once	Twice	Three Times	Four Times	Five Times	Six Times	Seven Times	Total	Average
Diabetic	No.	61	30	17	11	6	4	3	132	2.2
	%	45.9	22.6	12.8	8.3	4.5	3.0	2.3	100	
Endocrine	No.	80	25	12	5	0	0	0	122	1.5
	%	65.6	20.5	9.8	4.1	0	0	0	100	
Total	No.	141	55	29	16	6	4	3	254	1.9
	%	55.3	21.6	11.4	6.3	2.4	1.6	1.2	100	

TABLE 4.—*Economic Level*

	Per Cent of		Average Number of Fails per Patient	
Economic Level	132 Diabetic	122 Endocrine	132 Diabetic	122 Endocrine
A	31.8	34.4	2.19	1.52
B	23.5	27.9	2.35	1.32
C	44.7	37.7	2.14	1.67
	100	100	2.9	1.9

SUMMARY

"Clinic fails," i. e. missed appointments to return to the clinic the day agreed, were studied for the calendar year 1938. There were 254 failing patients having 477 missed appointments, which amounted to 14 per cent of the appointments made. The number of these fails which despite our best efforts could not be recovered amounted to 17 per cent of all the missed appointments. Diabetic patients seemed more negligent than the obese.

These results are most discouraging from the point of view of social economy, the time spent on them by the admitting office, clinical clerk, nurse, dietitian, physicians and social worker. Constructively, for the good of the greatest possible number of patients, particularly in connection with controversies about the best form of social health insurance, our results strongly indicate that first-visit patients (unless seriously sick) should be treated rather rapidly, which incidentally would save time for them also. This will spare the time of the clinic staff, time which seems likely to be better spent on such second-visit patients as exhaustive and therefore expensive (for some one if not for the patient) examination.

TABLE 5.—*Proportion of Fails Recovered by Postcards*

		After 1 Card	After 2d Card	Reported But Did Not Come	Remainder Needing Home Visits	Total
Diabetic	No.	183	64	4	40	291
	%	62.9	22.0	1.4	13.7	100.0
Endocrine	No.	117	19	9	41	186
	%	62.9	10.2	4.8	22.0	99.9
Total	No.	300	83	13	81	477
	%	62.9	17.4	2.7	17.0	100.0

TABLE 6.—*Home Visits*

Fails remaining for home visits:			
Diabetic	40	Endocrine 41	Total 81
Not recovered by home visits:			
Diabetic	24	Endocrine 35	Total 59
Recovered by home visits:			
Diabetic	16	Endocrine 6	Total 22 = 27.2%
Moved, no address			14
Moved out of town			5
Not found in			14
Transferred to another physician or clinic			4
Dead			3
Declined because felt well			1
Because of grievance			1
Promised to return but did not			15
			59

HOW CAN YOU MAKE THEM TAKE IT?

Statistics of smallpox offer clinching evidence that something besides poverty and inaccessibility accounts for failure to receive needed medical service. It is more than a century since vaccination has been proved to constitute complete protection against a deadly and disfiguring disease, and it is available almost everywhere at little or no expense. Yet the United States Public Health Service in *Public Health Reports* **54**:1091 (June 23) 1939 says "The United States led all other nations of the world except India in the number of smallpox cases reported in 1937."

Only neglect of vaccination causes smallpox to find thousands of victims in some sections of the country and none at all in others. "New Jersey, with a population of about 4,400,000, has not had a case for more than seven years, while the states of North Dakota, South Dakota, Montana, Idaho, Oregon, Wyoming and Utah, with a combined population less than that of New Jersey, reported during the same period a total of more than 12,000 cases. . . . One of the explanations—not excuses—is probably the comparative mildness of the disease in recent years." But there is "always the danger that the malignant form may be introduced from outside our boundaries." That is just what appeared in one Western state where vaccination had been neglected. "Within twenty months 4,021 cases of the malignant disease occurred, taking over 500 lives."

HYGEIA LOAN COLLECTIONS

An important phase of the doctor's duty in the prevention of disease is the education of the public. One of the most effective mediums is the platform speaker, the personal appearance of the doctor before the lay audience. The Bureau of Health Education of the American Medical Association has made help available to the physician-speaker by furnishing him loan material from which he can prepare a paper or address on health suitable for a nonmedical audience. The material consists of *Hygeia* articles bound in a folder and accompanied by an outline. In 1936 the service began to be used by an increasing number of physicians.[1] There were 226 requests. It is operated on almost the same basis as the Package Library of the American Medical Association. In 1937 there were 375 requests, including three from Honolulu. In 1938 the demand for these collections more than doubled.[2] The accompanying maps for 1937 and 1938 show the distribution of requests for this material. The map for 1938 includes many foreign requests: Canada, China, Canal Zone, Puerto Rico and Alaska. During 1939 the demand for these collections has kept up and for the first six months 361 requests were received and filled. Collections have been sent to physicians in all states but one.

The New Jersey Medical Society and the Westchester County Medical Society of New York have developed speakers' services of their own. The Bureau aided these societies in obtaining material by sending them the back issues of *Hygeia,* the Health Magazine, in which the many articles used in the collections have appeared. This development makes it possible for physicians in those states to receive collected material directly from their local and state societies. The Bureau of Health Education will aid other societies desirous of establishing a loan collection service of this type in obtaining the material at the lowest possible cost.

It is difficult, if not actually impossible, to have enough collections on all the topics available to supply the many physicians who may request a particular subject at the same time. Although the Bureau has developed seventy-nine topics and has as many as twenty-two copies available on some of the more popular subjects, it is advisable for the speaker to name a second and third choice when ordering. In this way the physician is assured of receiving material on one of the subjects which he proposes to discuss. These collections are revised frequently and kept up to date by the addition of newly published material. New subjects are constantly being added and those which appear to be of little public interest are dropped. At the present time, collections are available on the subjects listed in the accompanying table.

Subjects on Which Collections Are Available

Anesthesia	330.1
Anemia	92.1
Appendicitis and Laxatives	177.0
Athletics and Exercise	318.1
Blood Transfusions	131.0
Cancer	61.0
Camps for Children	344.0
Child, Health of the Preschool	401.2
Child, Health of the School	401.1
Child's Health and His Future Career, The	291.0
Colds	151.4
Constipation and Cathartics	184.1
Communicable Diseases	47.1
Crippled Children	225.0
Deafness	121.1
Diabetes	74.1
Diet, Watch Your	302.4
Doctors—City and Country	322.1
Eyes, Adults'	120.1
Eyes, Children's	120.2
Family Medicine Chest, The	327.1
Feeding of Children	302.6
First Aid	349.0
Food, Drug and Cosmetic Racketeers	328.0
Food, Protection of	302.7
Gallbladder	180.1
Goiter	81.1
Growing Old Gracefully	261.1
Hair and Nails	236.0
Hay Fever—Allergy—Idiosyncrasy	305.1
Health Examinations	319.1
Health Examinations of Children	319.2
Healthy Living, Ten Points in	402.0
Heart Disease	150.1
Hospitals	342.0
Industrial Health	348.1
Infant Hygiene	251.0
Infantile Paralysis	16.0
Insect Pests, Ridding the Household of	331.1
Insect Parasites and Disease:	
1. Ticks, Mites, Lice, Bedbugs	331.2
2. Mosquitos, Roaches, Spiders	331.3
Kidneys	194.1
Leprosy	33.1
Maternal Hygiene	211.0
Mates or Mismates (Marriage)	426.0
Medical Advances, Outstanding	338.1
Mental Hygiene—Adult	122.1
Mental Hygiene—Child	124.2
Milk	337.1
Narcotics	105.0
Nursing	343.0
Obesity	73.1
Physical Education	318.3
Physical Therapy, X-Ray, Radium	335.0
Pioneers of Medicine	338.2
Play, Leisure and Recreation	320.1
Pneumonia	154.1
Posture	228.1
Progress in Preventive Medicine	338.0
Public Health	332.0
Ringworm	233.1
Rheumatism	72.1
Safety	288.0
Sex Education	422.0
Skin	238.0
Sunshine	315.1
Superstitions	333.1
Syphilis and Gonorrhea	34.1
Training for Athletics and Health	318.2
Teeth	172.2
Tonsils and Adenoids	171.0
Tuberculosis	23.1
Tuberculosis in Childhood	23.2
Tuberculosis Physicians	23.3
Vacation	320.2
Ventilation	316.1
Vitamins	302.2
Worms	42.1
Youth	124.3

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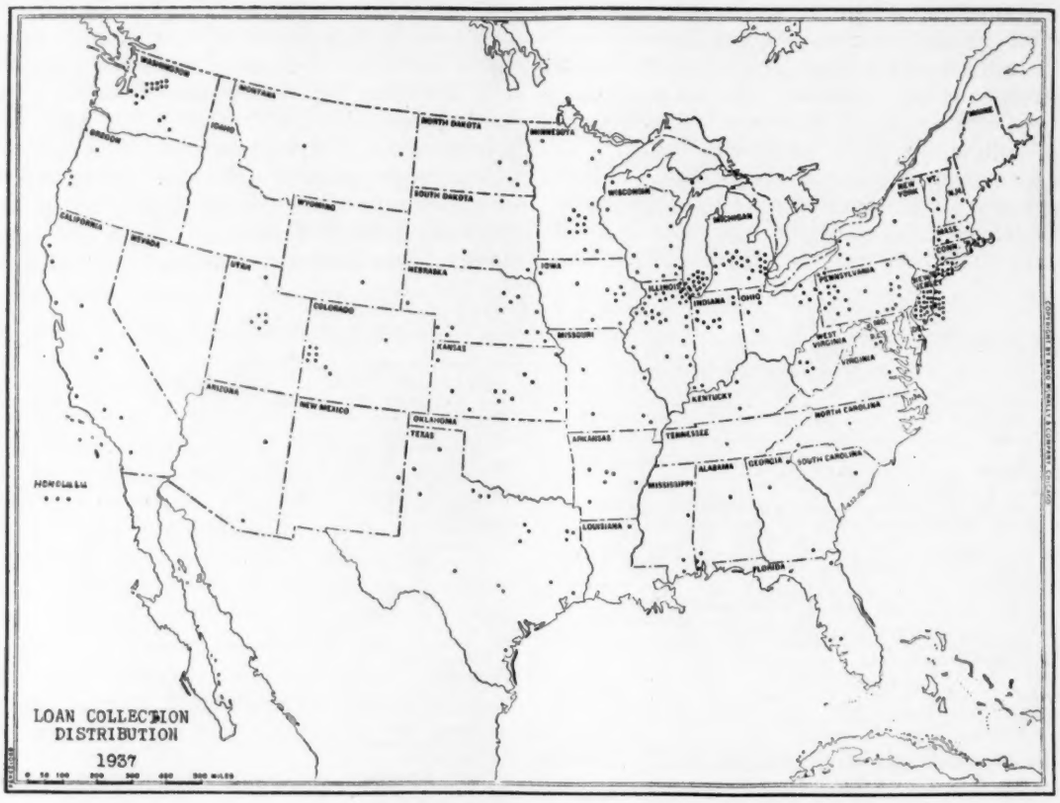
These clipping collections are available to any one preparing a paper or address on health for a lay audience. Only one collection may be borrowed at a time and it must be returned within ten days mailed flat. A return envelop will be furnished, on the flap of which will be penciled the amount of postage required to mail the material back to us. The material goes as third-class mail; the postage rate is one and one-half cents for two ounces.

Collections should be ordered by number and a second and third choice of subjects indicated. We will endeavor to send the first choice, but it may not be possible, owing to the great demand for these collections and the limited number available on a given subject. Cooperation in returning this material promptly will be appreciated. Make requests at least two weeks before a scheduled address.

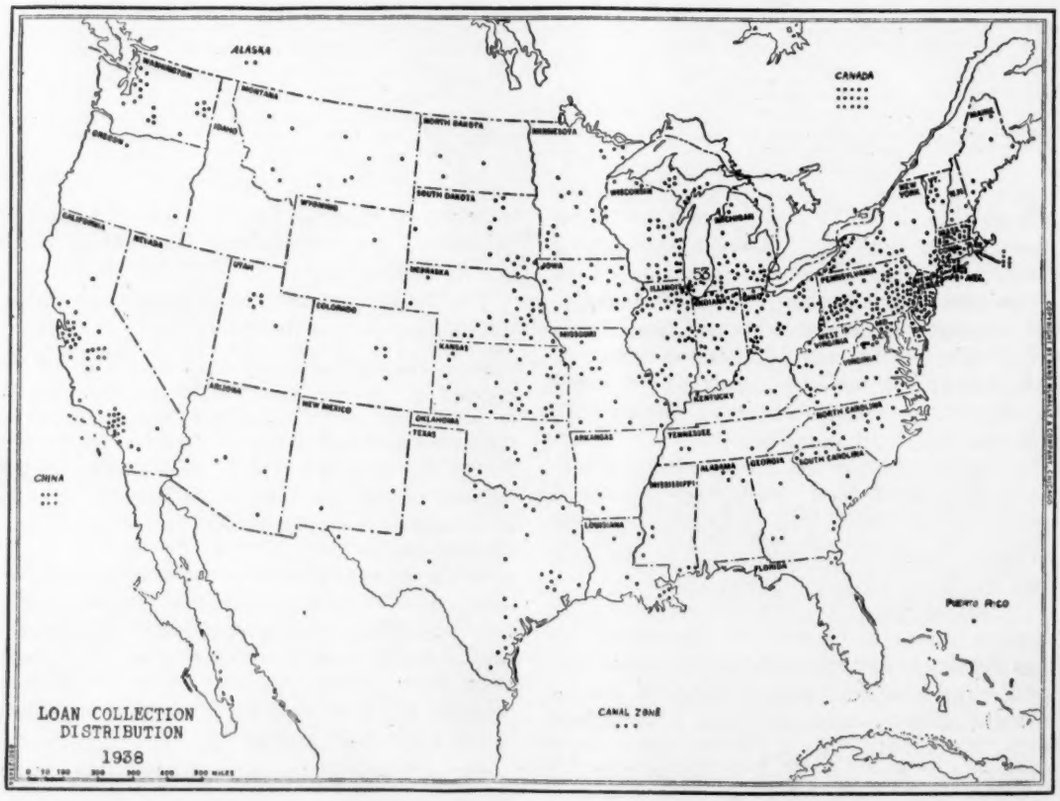
The county and state societies, through their speakers' bureau can well afford to offer the services of

1. Teschner, Paul A.: Doctors and Public Speaking, A. M. A. Bull. **31**: 131 (June) 1936.
2. Teschner, Paul A.: When Doctors Address the Public, J. A. M. A. **110**: 1558 (March 19) 1938.

physician speakers to the many groups that have regularly scheduled meetings in each community. Groups such as Parent Teachers Associations, women's clubs, service clubs such as Rotary, Kiwanis, Optimists, American Legion, church organizations and auxiliaries, and many other societies offer excellent opportunities for speakers. Not to be forgotten are the high schools and secondary schools found in each community. Through the schools, the physician will find opportunity to speak to various youth organizations such as the Boy and Girl Scouts and the 4-H Clubs. This group is ever eager for information that the physician has to offer. The dissemination of health knowledge must be repeated year after year as new groups replace the old.



Distribution of loan collection material in 1937.



Distribution of loan collection material in 1938.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ARKANSAS

Society News.—At the annual joint meeting and picnic of the Benton-Washington Counties Medical Society at Bentonville July 13 the speakers were Drs. Joy K. Donaldson, Little Rock, on "Improved Management of Appendicitis"; Merlin J. Kilbury, Little Rock, "Laboratory Findings in Appendicitis"; Felix A. Hughes Jr., Prescott, "Diverticula of the Gastrointestinal Tract," and Albert S. Buchanan, Prescott, an analysis of the Wagner Bill.

New Director of Venereal Disease Control.—Dr. Donald W. Dykstra, Morrilton, has been appointed in charge of the new syphilis control division of the state department of health, newspapers announced recently. He will assist Dr. Arthur M. Washburn, Little Rock, director of the division of communicable disease control. Another member of the new division will be Dr. Arthur B. Price, U. S. Public Health Service, who has been assigned to the state department for a year of field training. The division will undertake a survey of syphilis to determine the prevalence and results of treatment and is expected to launch a mobile venereal disease unit soon.

CALIFORNIA

Child Guidance Clinic at Stanford.—A grant of $10,000 a year for three years to Stanford University School of Medicine, San Francisco, by the Commonwealth Fund of New York has been announced, to finance a child guidance clinic under the joint direction of the departments of psychiatry and pediatrics. The new clinic will be an expansion of the present work on behavior problems and will provide opportunities for graduate and undergraduate training of physicians in this field. Dr. Ray Lyman Wilbur, president of the university, also announced acceptance of a gift of $200,000 from the Rockefeller Foundation for research in biologic sciences; $1,000 as a second instalment of a gift of $2,000 to the medical school for research in epilepsy from the William G. Irwin Charity Foundation, and $500 from the Sloss family to establish the M. C. Sloss Loan Fund for students.

CONNECTICUT

Society News.—Dr. Emil Novak, Baltimore, discussed "Endocrine Influence of Certain Ovarian Tumors" before a recent meeting of the Bridgeport County Medical Association. ——Dr. James L. Gamble, Boston, addressed the Hartford County Medical Society recently on "The Pathogenesis of Dehydration, Acidosis and Alkalosis."

FLORIDA

Personal.—Dr. George R. Creekmore, Brooksville, has been appointed a member of the board of commissioners of Hernando County.——Dr. Leigh F. Robinson, Fort Lauderdale, president, Florida Medical Association, was recently presented with a wrist watch by the Broward County Medical Society as a token of esteem.

New State Health Officer.—Dr. Albert B. McCreary, director of the bureau of county and district health work of the state board of health, Jacksonville, has been appointed state health officer to succeed the late Dr. Wilbur A. McPhaul. Dr. McCreary graduated from the University of Tennessee College of Medicine, Memphis, in 1922 and has engaged in public health work in Tennessee, North Carolina and Virginia. He has been with the Florida board for four years.

GEORGIA

Regional Health Officers Appointed.—In an expanded state health program six regional health units have been established under the supervision of the state department of health. Dr. Bert H. Malone has been appointed regional medical director of the southeastern regional office with headquarters in Waycross. Others are Drs. Robert B. Griffin, northwestern district, Marietta; Aaron Wilson Brown, northeastern district, Gainesville; Rufus Floyd Payne, west central district, Griffin; John M. Walton, east central district, Swainsboro, and Lester M. Petrie, southwestern district, Albany.

Fourth District Meeting.—At a meeting of the Fourth District Medical Society in LaGrange August 8 local speakers presented papers which were discussed by Atlanta physicians. They included:

Dr. Emery C. Herman, LaGrange, Pneumonia Complicated by Pneumococcal Meningitis Treated with Sulfapyridine. Discussion by Dr. Hugh Wood, Atlanta.

Dr. Kenneth D. Grace, LaGrange, Goiter Complicated by Other Conditions. Discussion by Dr. David Henry Poer, Atlanta.

Drs. Robert P. Morrow, West Point, and Enoch Callaway, LaGrange, Hyperinsulinism Treated by Resection of the Pancreas. Discussion by Dr. Henry C. Sauls, Atlanta.

Dr. James S. Holder, LaGrange, Fractures of the Femur. Discussion by Dr. Thomas P. Goodwyn, Atlanta.

Drs. William H. Myers, Savannah, and Job C. Patterson, Cuthbert, president and president-elect, respectively, of the Medical Association of Georgia, made addresses.

ILLINOIS

Typhoid Epidemic in Manteno State Hospital.—Eleven persons have died of typhoid and about 200 are ill at the Manteno State Hospital, Manteno, the Chicago *Tribune* reported September 5. Health department investigators have traced the outbreak to artesian wells from which the hospital's drinking water is obtained, but the possibility of a human carrier is also being investigated. All the 5,400 patients and 770 employees are being vaccinated.

Society News.—Drs. Guy M. Cushing and Chauncey C. Maher, Chicago, addressed the Henry County Medical Society, Kewanee, August 24, on "Acute Perforating Gastric and Duodenal Ulcers" and "Cardiorenal Disease with Emphasis on Renal Conditions" respectively.——Dr. Howard A. Lindberg, Chicago, director of the pneumonia serum center for the state department of health, will address the Rock Island County Medical Society September 12 in Moline on the pneumonia control program.

Chicago

Fund for Tuberculosis Survey.—The Julius Rosenwald Fund has made a grant of $3,000 to the University of Chicago to finance a search for unsuspected cases of tuberculosis among patients of the Provident Hospital Clinic. The fund will provide equipment for fluoroscopic examination of about 30,000 patients during the next year. All patients registered will be examined and the families of all those found to have the disease will also be examined, according to the announcement.

Criteria of Premature Birth.—The Chicago Board of Health recently issued a statement giving criteria of premature birth in order to simplify reporting of premature and immature infants. Physicians and hospitals should report any infant weighing 2,250 Gm. or less at birth and any premature infant, irrespective of weight. The regulations require that any immature infant shall be reported to the health department by telephone within an hour after birth, and the report must be confirmed in writing within twenty-four hours.

Surgical Society Offers Prize.—The Chicago Surgical Society announces that competition for its 1940 annual prize is now open to physicians, not members of the society, devoting themselves to surgery in Cook County. The prize of $250 will be awarded for the most meritorious original investigation in one or both of the fields of experimental and clinical surgery, which has not been printed or presented previously. The manuscript should bear no identification marks of individual, hospital or institution but should be accompanied by a sealed envelop bearing on the outside the title of the paper and containing within it the name and address of the author. The society reserves the right to make no award if the papers submitted do not have sufficient merit. Manuscripts should be sent to the secretary of the Chicago Surgical Society, 54 East Erie Street, Chicago, not later than March 1, 1940.

KANSAS

Annual Registration Due Between July 1 and October 1.—Physicians licensed to practice medicine in Kansas are required to renew their licenses annually between July 1 and October 1 and to pay a fee of $1 to the secretary of the board of medical registration and examination. The secretary must strike from the register of licensed physicians the names of all physicians who fail to pay their annual registration fees as required by law. Physicians whose names are so removed may be reinstated by paying the secretary $5 and submitting to him satisfactory proof of moral fitness.

KENTUCKY

Exhibit at the State Fair.—The University of Louisville School of Medicine is presenting a public exhibition at the state fair in Louisville. Specimens are being taken from the pathology museum and arranged under the direction of Dr. Aura J. Miller, professor and head of the department of pathology and serology in the medical school.

Society News.—Dr. Walter S. Wyatt, Lexington, addressed the Bourbon County Medical Society, Paris, August 17 on "Gastric and Duodenal Ulcers."——Dr. Francis M. Massie, Lexington, addressed the Harrison County Medical Society, Cynthiana, August 7 on "The Ameba as a Cause of Abdominal Pain."——Drs. Lee Palmer and Philip F. Barbour, Louisville, addressed the summer meeting of the Southwest Kentucky Medical Association in Bardwell August 1 on "Sulfapyridine in the Treatment of Pneumonia in Children" and "Acute Abdominal Conditions in Children" respectively.——Speakers at a meeting of the Muldraugh Hill Medical Society at the Brown-Pusey House, Elizabethtown, August 10 were Drs. Walter I. Hume and Thomas J. Crice, Louisville, on "Control of Hemorrhage" and "The Psychiatrist's Responsibility to Society and the So-Called Criminally Insane" respectively.——Drs. Burnett W. Wright, Nashville, Tenn., and William R. McCormack, Bowling Green, addressed the Third District Medical Society in Bowling Green July 19 on "Stones in the Upper Urinary Tract" and "Management of Breech Deliveries and Placenta Praevia" respectively.

MAINE

New State Health Officer.—Dr. Roscoe L. Mitchell, assistant director of the bureau of health in the state department of health and welfare, has been appointed director to succeed Dr. George H. Coombs, who resigned. Dr. Mitchell graduated from the University of Vermont College of Medicine, Burlington, in 1908.

MARYLAND

Personal.—Dr. Robert H. Riley, Baltimore, state health officer, was given a testimonial banquet July 5 in celebration of his completion of twenty-five years on the staff of the department.——Dr. Frank B. Hines, Chestertown, has been named deputy medical examiner for Kent County by the newly created Maryland Postmortem Examiners' Commission, it is reported.

Bacteriologist Dies.—Dr. Otto Wolfgang Wichelhausen, assistant in bacteriology at Johns Hopkins University School of Medicine, Baltimore, since 1937, died suddenly at Bar Harbor, Maine, August 14, aged 35. Dr. Wichelhausen took his medical degree from the University of Goettingen in 1933 and held degrees from the University of Düsseldorf and the Hamburg Institut für Schiffahrts and Tropenhygiene. He had conducted research on anaphylaxis in guinea pigs with plant antigens, sulfanilamide in experimental streptococcic infections and oral infections.

Medical Historian Retires from Johns Hopkins.—Dr. John Rathbone Oliver, since 1930 associate in the history of medicine at Johns Hopkins University School of Medicine, Baltimore, having reached 67 years of age, is retiring. Dr. Oliver received his medical degree at the University of Innsbruck, Austria, in 1910, and the degree of doctor of philosophy from Johns Hopkins in 1927. He was a surgeon in the Austrian Army, 1914-1915; psychiatrist at Johns Hopkins Hospital, 1915-1917; chief medical officer to the Supreme Bench of Baltimore, 1917-1930, and professor of the history of medicine at the University of Maryland from 1927 to 1930.

MICHIGAN

University Promotions.—Dr. David A. Boyd Jr., Ann Arbor, has been promoted to be assistant professor of psychiatry at the University of Michigan Medical School and Russell T. Woodburne, Ph.D., to be assistant professor of anatomy.

First Mental Hygiene Institute.—The Michigan Society for Mental Hygiene, the Kalamazoo Mental Hygiene Committee, Western State Teachers and Kalamazoo colleges cooperated in holding the first statewide mental hygiene institute in Kalamazoo July 17-21. The speakers included Maud E. Watson, Ph.D., director, Children's Center, Children's Fund of Michigan, Detroit; Dr. David Slight, professor of psychiatry, University of Chicago; Dr. William H. Kelly, Lansing; Dr. Harry E. August, Detroit, and Fritz Redl, Ph.D., University of Michigan, Ann Arbor.

Changes in Health Officers.—Dr. Merle R. French, commissioner of health of Cortland and Cortland County, N. Y., has been appointed director of the Van Buren County Health Department with headquarters in Paw Paw.——Dr. Kalman S. Von Haitinger, formerly of the Hillsdale County health department, has been appointed health officer of the Midland County health department succeeding Dr. Edwin H. Place, resigned.——Dr. Erwin F. Hoffman, Mason, has been appointed director of the Dickinson County health unit to succeed Dr. Philip E. M. Bourland, Iron Mountain, resigned.

Personal.—Dr. Floyd J. Barkman has resigned as head of the Berrien County Hospital, Berrien Center, a position he has held since the hospital was opened May 5, 1937, it is reported. The resignation was effective August 1.——Dr. William T. King, Ahmeek, head of the medical staff of the local mine for the past thirty-five years, was honored by more than 400 employees of the mine when he was presented with a gold watch and a clock and fountain pen, and a leatherbound book containing all the signatures of the employees.——Dr. Marie A. Hagele, Chicago, has been appointed regional consultant in maternal and child health for the state department of health, effective June 1. Dr. Emily L. Ripka, who has been doing postgraduate work at Harvard University, has returned to the department as a regional consultant.

Advisory Council of Health Reorganized.—The appointment of new members to the state advisory council of health, serving in an advisory capacity to the state health commissioner, has been announced. New members include Drs. Carleton Dean, Charlevoix, director of district health department number 3; Addison D. Aldrich, Houghton; Roy C. Perkins, Bay City; John L. Lavan, health officer of Grand Rapids, and Henry F. Vaughan, Dr.P.H., health officer of Detroit. Retiring members of the council include Drs. Robert B. Harkness, Hastings; George J. Curry, Flint; William Lloyd Kemp, Birmingham; H. Lee Simpson, Detroit, and P. C. Lowery, D.D.S., Detroit. Dr. Vaughan was elected president and Dr. Lavan secretary. At the first meeting of the reorganized council May 26, it approved the regulation that hereafter all medical examination certificates issued by physicians outside of Michigan must be forwarded by the county clerk to the Michigan Department of Health for approval before such certificates may be accepted.

MISSOURI

Personal.—Dr. Evarts Graham, Bixby professor of surgery, Washington University School of Medicine, St. Louis, has served this year as head of the summer teaching surgical unit at St. Bartholomew's Hospital, London. The *Medical Alumni Quarterly* of the university said that Dr. Graham is the first American surgeon to be invited for this position, which is offered in alternate years to distinguished British surgeons.

Annual Clinical Conference in Kansas City.—The seventeenth annual fall clinical conference of the Kansas City Southwest Clinical Society has been set for October 2-5. The guest speakers, many of whom will speak several times, will be:

Dr. William Edward Chamberlain, Philadelphia, roentgenology.
Dr. George M. Curtis, Columbus, Ohio, surgery.
Dr. Temple S. Fay, Philadelphia, neurology.
Dr. Russell L. Haden, Cleveland, internal medicine.
Dr. Robert I. Harris, Toronto, Ont., orthopedic surgery.
Dr. Chevalier L. Jackson, Philadelphia, otorhinolaryngology.
Dr. Elliott P. Joslin, Boston, internal medicine.
Dr. Frank H. Lahey, Boston, surgery.
Dr. William H. Luedde, St. Louis, ophthalmology.
Dr. John L. McKelvey, Minneapolis, obstetrics and gynecology.
Dr. Albert Graeme Mitchell, Cincinnati, pediatrics.
Dr. Max M. Peet, Ann Arbor, Mich., surgery.
Dr. Curtice Rosser, Dallas, Texas, proctology.
Dr. James P. Simonds, Chicago, pathology.
Dr. Rock Sleyster, Wauwatosa, Wis., President of the American Medical Association, psychiatry.
Dr. Howard B. Sprague, Boston, internal medicine.
Dr. Gilbert J. Thomas, Minneapolis, urology.

There will be three round table conferences on diseases of the chest, treatment of common anorectal conditions and toxemias of pregnancy. There will also be round table luncheons each day. The Kansas City Society of Ophthalmology and Otolaryngology will sponsor a program Thursday October 5 with Dr. Luedde and Dr. Jackson as the guests. There will be scientific and technical exhibits and a hobby show.

NEBRASKA

Annual Registration Due on or Before October 1.—Physicians licensed to practice medicine in Nebraska are required by law to register with the Department of Public Welfare annually, on or before October 1, and to pay a fee of $1. A license expires if the licentiate fails to register, but within the thirty days next following its expiration it may be

revived by the payment of the registration fee and a penalty of $1. If that is not done, an order of revocation is issued and thereafter the revoked license can be reinstated only on the recommendation of the board of examiners in medicine and on the payment of the renewal fees and penalty then due.

NEVADA

State Medical Meeting. — The annual meeting of the Nevada State Medical Association will be held in Reno September 22-23. The following speakers appear in the program:

Dr. Laurence R. Taussig, San Francisco, Cutaneous Epitheliomas.
Dr. Fletcher B. Taylor, Oakland, Calif., Medical Follies of 1938.
Dr. Edward B. Shaw, San Francisco, Principles of Treatment of the Common Contagious Diseases.
Dr. Roger Anderson, Seattle, Fractures in the Region of the Hip.
Dr. Rupert B. Raney, Los Angeles, Temporal Lobe and Cerebellar Tumors and Sympathectomy in Angina Pectoris.
Dr. Everett B. Muir, Salt Lake City, Treatment of Small Injuries of the Eye.
Dr. Robert C. Martin, San Francisco, Ear, Nose and Throat in General Practice.
Dr. Ralph T. Richards, Salt Lake City, Oxygen Therapy.
Dr. Paul G. Flothow, Seattle, Treatment of Vascular Lesions of the Extremities.
Dr. Eugene S. Kilgore, San Francisco, Syphilis of the Central Circulatory System.

NEW YORK

Poliomyelitis in Buffalo.—Sixty-four cases of poliomyelitis in Buffalo between July 27 and August 29 led the health department to order public swimming pools closed, the New York *Times* reported August 30. Theaters were requested to refuse admission to children until further notice.

Urologic Meeting.—The Western New York and Ontario Branch of the American Urological Association will hold its ninth annual meeting in Buffalo September 15-16. The first day's session will be at the New York State Institute for the Study of Malignant Disease. Dr. Burton T. Simpson, director of the institute, will demonstrate methods of preparing radium for urologic cases and of high power therapy. There will be round table discussions and a special scientific exhibit. The Saturday program at the Hotel Statler will include addresses by Dr. William S. McCann, Rochester, on "Newer Developments in Hypertension"; James B. Hamilton, Ph.D., New Haven, Conn., "Male Hormones," and Dr. Ross H. Flett, Toronto, "Multiple Primary Malignancy in the Urinary Tract."

New York City

Symposium on Silicosis.—The Tuberculosis Sanatorium Conference of Metropolitan New York will sponsor a symposium on silicosis at the Cornell University Medical College amphitheater, October 11. Dr. Grant Thorburn will preside and the speakers will be Drs. Anthony J. Lanza on the etiology and diagnosis; John R. Carty, the radiographic aspect, and Mr. Theodore C. Waters, Baltimore, the medicolegal aspect.

Courses for Graduates.—Two courses of eight weeks each, reviewing recent advances in clinical medicine and important technical procedures, will be offered by Columbia University to qualified graduates in medicine during the winter. One is announced for the period between November 6 and December 30 and the other from February 5 to March 30. Both will be given at Mount Sinai Hospital. Information may be obtained from the dean of the school of medicine, Columbia University, 630 West One Hundred and Sixty-Eighth Street, New York.

NORTH CAROLINA

Convalescent Home for Crippled Children.—The Asheville Orthopedic Home, sponsored by the Rotary Club of Asheville and the Asheville Junior League, was dedicated July 30. Funds for the new headquarters were collected in a drive last winter. Establishment of the home, which is equipped to care for forty convalescent orthopedic patients, is an outgrowth of the Asheville Crippled Children's Clinic started twelve years ago by Dr. Edward King, now of New York. The clinic was at first held once a month, but for the past three years three clinics a month have been held in Asheville and one in Bryson City. All clinics are now held in the new home. Operations are performed in Asheville hospitals and the children are then removed to the home for convalescent care. All patients are admitted through the clinic. In addition to the local support, the state division for crippled children will finance the care of some children with state and federal funds. Dr. John T. Saunders, Asheville, who has conducted the clinic for the past six years, is the orthopedic surgeon in charge of the home. At the dedication July 30 Drs. Carl V. Reynolds, state health officer, formerly of Asheville, and Joseph Warren White, orthopedic surgeon in charge of the Shriners Hospital for Crippled Children, Greenville, S. C., were the principal speakers.

OKLAHOMA

Faculty Changes at Oklahoma University.—The following promotions, among others, were recently announced by Dr. Robert U. Patterson, dean, University of Oklahoma School of Medicine, Oklahoma City:

Dr. Henry H. Turner, to be associate professor of medicine.
Dr. Ernest Lachmann, associate professor of anatomy.
Drs. Leo F. Cailey, Edmund Gordon Ferguson, James Jackson Caviness, James Robert Reed and Fay Maxey Cooper, assistant professors of ophthalmology.

Among new appointments announced were the following:

Irwin Clinton Winter, Ph.D., to be assistant professor of pharmacology.
Harold A. Shoemaker, Ph.D., professor of pharmacology, appointed vice dean, succeeding Louis A. Turley, Ph.D.
Dr. Owen Royce Jr., assistant director, outpatient department of the University and Crippled Children's hospitals.
Dr. Maynard S. Hart, assistant director of the laboratories at the University and Crippled Children's hospitals.

OREGON

Society Suggests Curb on Ambulance Speeding.—The council of the Oregon State Medical Society at a recent meeting adopted a resolution urging that emergency vehicles such as ambulances be operated in accordance with state laws and local traffic ordinances. The council stated that it did not favor promiscuous speeding by ambulances and is of the opinion that under most circumstances it is in the best interests of the patient and the public for ambulances to be operated at normal rates of speed and without the extensive use of sirens or horns. The resolution was sent to all component societies with the request that each society try to obtain adoption of this policy in its community.

PENNSYLVANIA

Society News. — A discussion of sulfanilamide and sulfapyridine featured the meeting of the Lycoming County Medical Society, Williamsport, July 14; the speakers were Drs. James Stanley Smith on infections of the genito-urinary tract; Alexander W. Blumberg, sulfapyridine in the treatment of pneumonia, and Carl J. Baier, Williamsport, infections of the upper respiratory tract.

Philadelphia

Promotions and Appointments at Jefferson.—The following promotions and appointments in the teaching corps of the Jefferson Medical College were made during the last session:

Dr. Bernard J. Alpers, professor of neurology.
Dr. Lewis C. Scheffey, clinical professor of gynecology.
Dr. Arthur J. Davidson, clinical professor of orthopedic surgery.
Dr. Edward F. Corson, clinical professor of dermatology.
Dr. Creighton H. Turner, associate professor of medicine.
Dr. Garfield G. Duncan, associate professor of medicine.
Dr. Abraham Cantarow, associate professor of medicine.
Dr. Robert A. Matthews, assistant professor of psychiatry.
Dr. Leandro M. Tocantins, assistant professor of medicine.

SOUTH DAKOTA

Basic Science Board Appointed. — Pursuant to a law passed by the 1939 legislature, Governor Bushfield has appointed a basic science board. The members are Dr. James D. Alway, Aberdeen; F. E. Burkholder, D.O., Sioux Falls; M. L. Severence, Aberdeen, chiropractor; William H. Waller, Ph.D., professor of anatomy, University of South Dakota School of Medicine, Vermillion, and Gregg M. Evans, Ph.D., professor of chemistry and physics, Yankton College, Yankton.

TEXAS

Personal.—Dr. Van C. Tipton has been appointed director of the health department of the city of San Antonio.——Dr. and Mrs. John Mark O'Farrell, Houston, celebrated their fiftieth wedding anniversary August 14.—— Dr. Ernest W. Prothro, Corpus Christi, has recently succeeded Dr. Thomas B. Wilson as health officer of Nueces County and Corpus Christi.

Society News.—Dr. Cullen H. Hendry, Beaumont, addressed the Jasper-Newton Counties Medical Society, Kirbyville, recently on nasal allergy.—— At a meeting of the Wichita County Medical Society in Wichita Falls recently in conjunction with the Northwest Texas Health Association the speakers were Drs. Elbert W. Wright, Bowie, on "Relationship of Public Health to Organized Medicine"; David L. Robertson, Wichita Falls, "Functions of a Venereal Clinic," and Robert B. Wolford, Mineral Wells, who showed a motion picture on syphilis.—— The Dallas Academy of Internal Medicine was recently organized with these officers: Drs. David W. Carter Jr., president; Walter G. Reddick, vice president, and Edward S. Ross, secretary.——Dr. Cleve C. Nash, Dallas, addressed the Cooke County Medical Society, Gainesville, July 10, on diagnosis and treatment of head injuries.

WISCONSIN

Examination for Psychiatrist. — The Milwaukee County Civil Service Commission will hold examinations for medical director of the county asylum and hospital for mental disease in the near future. Applications must be filed by September 22 with the commission, room 206, Court House, Milwaukee. The salary is from $4,500 to $5,000 with full maintenance for the physician and family. The examination will be open to graduates of medical schools licensed or eligible for license in Wisconsin, with one year's postgraduate training in neuropsychiatry or the equivalent, five years' institutional experience, ability to direct, organize and coordinate staff and employee activities, good health, personality and professional ability.

PUERTO RICO

League Against Cancer.—The Puerto Rican League Against Cancer has carried on a campaign since its organization in 1938, a recent report indicates. The league cooperates in the establishment of clinics and dispensaries, provides aid to curable indigent patients, and encourages clinical and experimental study of causes and treatment. An educational campaign also has been carried forward. The legislature enacted a law creating a cancer institute and allotting $200,000 for a building and equipment, but an appropriation is lacking at present to carry this plan into effect. Funds raised during the last year enabled the league to buy x-ray equipment and the president, Dr. Isaac F. Gonzalez-Martinez, San Juan, donated 50 mg. of radium for a free emergency clinic. Hospitalization has been provided for a number of patients. It is expected that the National Cancer Institute of the U. S. Public Health Service will grant a loan of 200 mg. of radium. Local committees of the league have reported that there are candidates for hospitalization and treatment in all of the fifty-five towns represented.

GENERAL

International Hospital Congress Canceled.—Dr. Malcolm T. MacEachern, Chicago, president of the International Hospital Congress which was to have been held in Toronto September 19-23, announced September 2 that the congress has been canceled because of the European war.

Bibliography on Nutrition. — The community education section of the American Dietetic Association has recently published a bibliography on normal nutrition. It lists twelve reference and text books on nutrition, ten "more readable—less technical books," and seven recent review articles. The bibliography is available at the offices of the association, 185 North Wabash Avenue, Chicago, for 10 cents a copy.

Paper Industry Sponsors Bacteriologic Research. — The paper industry, through the American Paper and Pulp Association, has launched a program of bacteriologic research which it is believed will contribute to better understanding of sanitary problems involved in manufacture and conversion of paper to be used in packaging foods. The Institute of Paper Chemistry, Appleton, Wis., will carry on the fundamental work prerequisite to the establishment of standard technics and Fred W. Tanner, Ph.D., Urbana, Ill., will work with the institute in an advisory capacity.

Prize in Thoracic Surgery.—The American Association for Thoracic Surgery announces a prize of $250 to be awarded at the next annual meeting for the best paper submitted to the program committee on some subject relating to the study of chest diseases. The prize is offered by the Rose Lampert Graff Foundation of Los Angeles. Any physician in good standing in the United States or Canada may submit a paper to the committee, of which Dr. Richard H. Meade Jr., 2116 Pine Street, Philadelphia, is secretary, before March 1, 1940. The committee will award the prize only if in its opinion a paper of sufficient merit has been presented. If the prize is not awarded in 1940 it will be held over for 1941. The 1940 meeting will be in Cleveland June 6-8.

Surplus Food to Be Used for School Lunches.—The U. S. Department of Agriculture announced August 22 that a program of providing free lunches for undernourished school children carried out last year in 14,000 schools would be expanded during the coming term to serve five million children. The school lunch program is carried out by the Federal Surplus Commodities Corporation in cooperation with the Works Progress Administration and local educational, civic and welfare agencies. Surplus agricultural products are bought by the FSCC and made available to schools through state welfare agencies. Last year 800,000 children in every state as well as in Puerto Rico and the Virgin Islands participated in the free lunch program, utilizing more than thirty million pounds of fifty-four different food commodities.

Public Health Meeting in Pittsburgh.—The sixty-eighth annual meeting of the American Public Health Association will be held in Pittsburgh October 17-20, with the sixth annual institute of public health education as a preliminary feature. Headquarters will be at the Hotel William Penn. Six general sessions are announced. Dr. Edward S. Godfrey Jr., Albany, N. Y., will give his presidential address and Dr. Milton J. Rosenau, Chapel Hill, N. C., will inaugurate the Delta Omega lectureship with a lecture entitled "New Lamps for Old." At other general sessions subjects of discussion will be: medical care, the "American way" as seen from abroad, cancer and professional education. Symposiums announced for sections, singly and in joint sessions, include: illness in industry and its control, pneumonia, food poisoning, gastro-enteritis, nutrition, venereal diseases and the newer venereal diseases. The institute of health education will be held October 15-17.

Mississippi Valley Tuberculosis Meeting.—The twenty-sixth annual meeting of the Mississippi Valley Tuberculosis Conference and the Mississippi Valley Sanatorium Association will be held at the Hotel Fontenelle, Omaha, September 20-22. The first day the tuberculosis conference will hold a child health program and Thursday the two groups will hold a joint meeting. Among speakers who will appear are:

Dr. Calvin C. Applewhite, U. S. Public Health Service, Chicago, Tuberculosis Control Aided by Effective Vital Statistics.
Drs. Arthur A. Pleyte and Edward K. Steinkopff, Milwaukee, Screening for Tuberculosis by Fluoroscopy.
Dr. Kenneth L. Burt, Howell, Mich., Pulmonary Tuberculosis and Moniliasis: A Study of 500 Patients.
Dr. Sumner S. Cohen, Oak Terrace, Minn., Review of Tracheobronchial Tuberculosis.

Dr. Henry D. Chadwick, Waltham, Mass., president of the National Tuberculosis Association, will speak at the annual banquet Thursday evening. Dr. Hyman I. Spector, St. Louis, is president of the tuberculosis conference and Dr. William J. Bryan, Rockford, Ill., of the sanatorium association.

Report on the Study of Suicide.—The Committee for the Study of Suicide, Inc., established in January 1936, has recently made a report of the progress of its work. The committee has made studies at Bellevue Hospital, New York; the Psychopathic Hospital of the University of Denver; McLean Hospital, Belmont, Mass., and the Institute of Psychoanalysis, Chicago. At Bellevue 1,227 patients have been examined and eighty-one of them in much detail. In 1936 6 per cent of the total admissions to the hospital were for attempted suicide, and in 1937 the percentage was 5.7. More than half of these patients were between 22 and 40 years old. In Denver 134 patients were studied, of whom fifty-one had suicidal trends. At McLean Hospital forty-four cases of suicide were studied and seventy-five patients with suicidal trends. At the Institute of Psychoanalysis in Chicago three analyses have been completed and four patients are still under analysis. The committee plans to publish several volumes as soon as the records of its various projects have been collected. The committee's headquarters are at 57 West Fifty-Seventh Street, New York, and the secretary and director of research is Dr. Gregory Zilboorg.

CANADA

Quebec Hospital Celebrates Tercentenary.—The Hotel-Dieu de Quebec celebrated its three hundredth anniversary August 23-28 during the biennial convention of the hospitals of Quebec. The *Canadian Medical Association Journal* says that this is the oldest hospital in Canada and, with the possible exception of one in Mexico, the oldest in North America. The hospital was founded by three nursing sisters of the Order of Augustinians of Dieppe, France, who came to Canada at the expense of the Duchesse d'Aiguillon, a niece of Cardinal Richelieu, after colonists had appealed for aid. The hospital was conducted in various buildings through the years and in 1755 the building was burned with nearly all the old records and equipment. At present it is a modern hospital with 350 beds and is a teaching unit of Laval University. It is said that the Hotel-Dieu de Quebec developed the first outpatient department in the country and that it was the first hospital to train nurse attendants.

CORRECTION

Neurology and Neurosurgery.—In the Educational Number of THE JOURNAL August 26, page 846, in conformity with an official report from the University of Chicago Clinics, there was listed an approved residency in neurology. A later report from the university indicates that this service includes also neurosurgery.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Aug. 14, 1939.

Mobilization of Physicians for War

Government plans for the mobilization of physicians in war have been announced by the Ministry of Health. They have been agreed on between the ministry and the Central Emergency Committee of the British Medical Association. The scheme provides for a national hospital medical service for the treatment of casualties. Physicians joining it will assume for a period of three years a definite liability to serve in an emergency. The service will be recruited from physicians other than those already in whole-time employment of the government or the local authorities. There will be two classes of service: Class A physicians will in an emergency be called up for whole-time hospital service with liability to transference to any part of the country. Those required at the outset will be called up as soon as an emergency arises; others will be called up later as required. Class B physicians will be liable to hospital service on a sessional basis in their own hospital area. The scale of salaries in class A areas follows: consultant adviser $7,000, group officer $6,500, medical superintendent of a hospital of 1,000 beds and over $6,000, of 750 beds $5,000, of 300 beds $4,500, officer in charge of surgical or medical division hospital of 500 beds and over $4,750, specialists $4,000, medical officers $2,750, house officers $1,750. The salaries are on a resident basis; if board and lodging are not supplied, an allowance of $500 will be paid in lieu thereof. Class B physicians will be paid $13 a session for consultant and specialist work of two hours' duration up to five sessions in any one week with $10 for other sessions. General practitioners will be paid $8 a session of two hours' duration. Physicians so employed will not wear a uniform but a distinguishing badge. They will be allocated to their wartime positions now. Thus there will be created in peace time an expanded system of casualty hospital staffs which can function automatically at a moment's notice. This will involve allocation to hospital staffs of physicians engaged in private practice, but the British Medical Association has elaborated a scheme for the maintenance in every area of an adequate number of physicians and the safeguarding of the practices of those who are called up.

An Orthopedic Unit for China

During the past year the Chinese Red Cross has come to realize the importance of orthopedics in war surgery and has sent an appeal to the British Orthopedic Association, which was asked to provide a small teaching unit (250 beds) to be established behind the Chinese lines, and a surgical director to instruct Chinese surgeons in orthopedics so that they will be able to deal more competently with the enormous numbers of wounded in their hospitals. A sum of $1,750 is required, $50 for each bed and $5,000 for special equipment. It is most unusual for a small and purely scientific body such as the British Orthopedic Association to undertake a responsibility of this kind, but it felt that the appeal could not be refused. Its members (all the British orthopedic surgeons) have given more than $5,500 in sums varying from $5 to $500. As they cannot subscribe all that is required, they have asked, in cooperation with the British Fund for the Relief of Distress in China, the aid of the medical profession as a whole. In the appeal issued over the signature of the president, Mr. Naughton Dunn, it is stated that this country has given the world Sir Robert Jones, the greatest orthopedic surgeon of all time, and it is natural that another country desperately in need of enlightenment in the treatment of limb and spinal injuries should look to us. With necessary support it will be possible to dispatch a surgeon with little delay, as arrangements for administration of the fund have just been completed. He will instruct the Chinese surgeons in orthopedic surgery.

The Fight Against the Tsetse Fly

The tsetse fly, carrier of the trypanosome of two fatal diseases—trypanosomiasis in man and nagana in cattle—dominates about one fourth of the continent of Africa, where it is holding up colonial development. First discovered in Uganda in 1901, trypanosomiasis had it was estimated killed in the whole of the affected area more than 200,000 out of a population of 300,000. Only the unceasing efforts of a band of workers eventually stemmed the tide and saved other tribes from extinction. Whole tracts of the shores of Victoria Nyanza had to be abandoned, and their resettlement has been possible only in the last four years and then under the strictest control. The story of Uganda could be repeated in fifty other districts. In huge areas of the Congo, 80 per cent of the inhabitants are suffering from trypanosomiasis.

Of the drugs produced for the treatment of trypanosomiasis three—atoxyl, antrypol and tryparsamide—are in common use. The first two will cure early cases but fail in advanced ones. Tryparsamide is more efficacious, but if the initial treatment does not eliminate the disease the trypanosomes become arsenic fast and, what is more serious, persons subsequently infected by one of these strains cannot be cured by arsenic. Obviously the only solution would be eradication of the fly, but this is impossible in a vast continent with the tsetse fly's main strongholds in the undeveloped wilds. What is being done is to concentrate on the places where the fly and man are in close contact. The physiology and ecology of the tsetse fly and every aspect of its infection by trypanosomes have been minutely studied. It has been proved that it hunts by sight and not by smell. An effective pupa trap costing a few cents has been devised. Bush clearing, by destroying the primary haunt of the fly, has proved successful. With riverine species this is not difficult, and it has been shown that it is not necessary to cut out the whole riverine vegetation. Blocks can be left in which the fly can be exterminated by hand catching. But with the game-feeding tsetse, which feeds over a wide area, clearing would involve hundreds of square miles and the cost would be prohibitive. The method adopted is to cut long corridors and deal by various methods with the isolated blocks. Control of grass burning, an annual custom among the pastoral and hunting tribes, has proved effective. Fiercer fires destroy the breeding places. Game reduction has been successful in Rhodesia, but this drastic measure has, apart from other considerations, two dangers. Such a radical change in a country's fauna must have far reaching effects. If, as has happened in some cases, the game is exterminated, the fly may concentrate on man and domestic stock. In spite of these efforts and local successes, the fly is spreading into new districts. This is largely due to the opening up of the country and improvements in transportation.

Hospital Provident Scheme for the Middle Classes

Provident schemes for the working class by which small weekly payments entitle the members to hospital treatment if they should require it have been established in recent years. Schemes for the middle classes have been under discussion for some time. Definite proposals have at last been made and were mentioned by the duke of Kent at the council meeting of King Edward's Hospital Fund. The scheme is designed to afford to subscribers complete coverage for a period up to four weeks in a pay bed of a hospital and will be based on agreement by the hospitals and the specialists and consultants

to accept suggested rates of fees. These and the income limits have been approved by a group of representatives appointed by the British Medical Association. They are as follows:

	Income Limit	Quarterly Subscription
Single subscribers	$2,000 per annum	$3
Married subscribers	$2,750 per annum	$4½
Married subscribers with dependents under 18	$3,500 per annum	$5

PARIS

(From Our Regular Correspondent)

July 29, 1939.

Compulsory Diphtheria Vaccination

Pasteur said in 1881 at the seventh International Congress of Medicine in London, when he announced the immunization of animals against chicken cholera and anthrax, "I have given to the name 'vaccination' an extended meaning which I hope science will adopt as a tribute to the deserts and inestimable services rendered by one of the greatest men of England, Jenner." Thus Pasteur bestowed on all immunizations the name which Jenner had given to his procedure.

Jules Renault, before the Academy of Medicine, in connection with compulsory diphtheria vaccination, gave an account of the social applications of the different vaccinations. He recalled that prophylaxis against diphtheria was first brought about by means of the combination of toxin and antitoxin after the discoveries of Park and then by anatoxin when Ramon showed in 1923 that a toxin exposed for several months to the action of formol lost its toxicity but not its prophylactic power. The academy had demanded since 1927 that anatoxin vaccination be made compulsory but the law was not promulgated until 1938. It stipulates: "Antidiphtheria vaccination with anatoxin is compulsory in the course of the second or third year of life." France had been preceded by other countries, including Poland, Switzerland and Rumania, in compulsory legislation. However, anatoxin is not generally endorsed. It is well known that it confers immunity under ordinary conditions only on about 98 per cent of the children inoculated. Failure to be effective in the 2 per cent of cases opened the way to criticisms of its efficacy. Nevertheless the repetition of the injection, applied at present six months after the vaccination, permits elimination of even this residual percentage. The law also provides that in cases of war or epidemics the entire population of menaced areas be revaccinated. Anatoxin acts with the same constancy at all age levels. It is not subject to anaphylactic accidents, since it is not a serum. It never induces grave reactions. The accusations made against it in a recent campaign can be utterly rejected, according to Renault and the whole academy.

In France, 2,400,000 infants have been vaccinated. Only seventeen deaths were reported following closely on the heels of vaccination. Of these seventeen deaths, thirteen ought to be attributed to other causes than anatoxin and were simple coincidences. The other four cases were obscure. Obtainable data were uncertain and did not inspire conviction. However, even though mortality in four cases is admitted, the risk of accidental postvaccinal death is reduced to 1 in 600,000 cases. On the other hand, statistical analyses of diphtheria conclusively show that morbidity and mortality have diminished since the general use of anatoxin and that the diminution was proportionate to the frequency of vaccinations. The age of 2 or 3 years was chosen because children enjoy immunity before this time, transmitted no doubt by the blood of the mother. From the second year susceptibility is great and remains so during the school age of the child. According to the requirements of the law, 10,620,000 children are subject to vaccination. Anatoxin vaccination, while compulsory, is rendered free of charge except for those who prefer to consult a practicing physician. Parents who object to compulsory vaccination make themselves liable to prosecution.

Poliomyelitis

Pierre Lépine of Lyons and his collaborators stated before the Academy of Medicine that they believed that the conception of poliomyelitis as due strictly and solely to a neurotropic virus ought to be abandoned and that this disease should be regarded as a general disease with occasional neuraxial determinations. They based their view on observations of a case of epidemic transmission with familial implications. A man aged 28 entered the hospital with the diagnosis of acute angiocholecystitis. He had had diphtheria in infancy complicated by paralysis of the velum of the palate. The disorder for which he was hospitalized had begun with fever, which developed into bronchopneumonia with paralysis of the velum of the palate. Necropsy revealed typical lesions of poliomyelitis. The case, therefore, was one of acute anterior poliomyelitis with exclusively bulbar localization in the classic but exceptional form of Heine-Medin disease. The patient had two young children. Both had manifested slight febrile conditions of benign nature somewhat sooner than their father. Lépine suspected poliomyelitic infection and sought the virus in their stools. One of the children yielded negative results in spite of several tests. The other, however, was found in three successive tests to be the carrier of the virus after inoculation with Macacus rhesus serum. The virus was discovered forty-one, seventy-four and 123 days after the first indeterminate manifestation of fever and would have passed unobserved except for the necropsy performed on the father. Subsequent tests conducted with the same technic revealed the presence of the virus in diminishing quantity.

Lépine wanted to find out how the serum of this child would react in the presence of a poliomyelitic serum and discovered that the virus was strongly neutralized by the serum. He therefore concluded that a child in good health, having shown only a transient and benign infection by poliomyelitis virus, can eliminate the virus in the feces for a prolonged period of time and thus become a carrier of the germ.

BERLIN

(From Our Regular Correspondent)

July 31, 1939.

Congress for Internal Medicine

The Congress for Internal Medicine was held in the spring in Wiesbaden. About 1,800 physicians attended. Prof. Wilhelm Stepp of Munich in his opening address pointed to the dangers that grow out of the changed mode of living of our time, in particular to the errors committed in nutrition. Its consequences are decreased performance and lessened power of resistance against infections of all kinds. The vitamin authority György demanded that solely the state of highest power of performance and of resistance of the organism be designated by health. Some diseases, such as arteriosclerosis, Stepp continued, are closely connected with errors of the individual mode of living, agitated life with an excessive amount of work, excitement and care, abuse of luxuries such as tobacco, and so on. The subjects for this year's discussions were selected with the thought in mind of keeping Germans fit up to an advanced age. The meetings of the first two days were held jointly with the Society of German neurologists and psychiatrists. Arteriosclerosis was the first main theme and Ludwig Aschoff of Freiburg read the first paper. He adhered to the definition of Marchand given twenty-five years ago at this same place, i. e. designation of the diseases of the vessels due to their being used up as atherosclerosis. The clinician includes other diseases also in the motion of arteriosclerosis: the infectious processes and above all syphilis, the spastic vessel diseases, and nephrogenous and essential high blood pressure. Aschoff contrasts arteriosclerosis with all these diseases of the arteries and calls it a disease due to old age. Concerning the pathogenesis of atherosclerosis, the imbibition

of the vessel wall through the circulating blood was considered. Only the exterior third of the media of the large vessels is nourished by the vasa vasorum, while the inner layers are fed through the lumen of the vessel. The imbibition of calcium in the regions with disturbed nutrition takes place after the deposit of lipoids. For this the slight increase of the lipoid and calcium level in the blood at an advanced age should be held responsible also in endocrine diseases and the like. Although the increase is small, it may lead to extensive deposit throughout the decades. Besides, in an advanced age there is a greater affinity of the tissues to lipoids and calcium salts. Physical factors also influence the place of deposit. The pressure within the vessels is of importance, since there is atheromatosis in the pulmonary artery only in case the pressure of this artery is increased. The significance of the mechanical strain on the vessels follows also from the fact that the places of origin of the intercostal arteries as well as the bifurcation of the iliacs are places of preference; especially strong mechanical vibrations take place there. Among the external influences occupation and nutrition are significant, even though it is not yet known for certain which factors of nutrition, histamine and so on, are important. The use of tobacco is certainly connected with the sclerosis of the coronary vessels, while consumption of alcohol does not favor the formation of atherosclerosis. The constitution should also be mentioned, although in general the external factors are more important.

Walther Frey of Bern, a clinician, reported on the important diagnostic improvements of the last years. As to pathogenesis, the statistics point more and more to the inheritance factor. The influence of nourishment and tobacco is yet uncertain. There is no relation between alcoholism and atherosclerosis. The influence of infections, of nervous strain and of nutrition is questionable. Prophylactically those measures are the most important which promote the circulation of blood through the organs and vessels and which direct the various mechanisms of regulation through which the vascular system protects itself from overloading. Muscular activity, stay in the open air and care of the skin are the best. Therapeutically it remains to be seen whether the tissue structure can be improved through a correction of the endocrine dysfunctions as well as through the use of substances and measures which promote oxidation and the circulation of blood in the tissues (vitamins, chlorophyll, warmth, diathermy, baths).

The clinician Bürger of Leipzig spoke on the results of chemical examinations for age on the blood vessels. There the process of growing old can be observed early. A decrease of elasticity can be observed at the age of 20. The wall of the aorta thickens with age through transformation of its entire structure. Chemical examinations of fifty normal human aortas showed that the cholesterol, lipoid substance and acid soluble phosphorus contents of the aorta increase, while the phosphatides do not.

As a result of his observations on the influence of the nervous system on the circulation of the blood, Otfried Foerster of Breslau reported that, as against the ganglion extirpation in angiospastic conditions of the extremities, preganglionary cutting of the sympathetic is practiced with great success. He pointed to the curative results through bilateral cutting of the splanchnic nerves in essential hypertension. From the discussion it became apparent that the opinions are greatly divided about the importance of alcohol and tobacco in atherosclerosis.

Franz Volhard of Frankfort on the Main dealt with the treatment of high blood pressure. Lowering of the increased blood pressure will be obtained through lowering the demands on the circulation; in acute cases through venesection, in chronic cases through diet. There is no better expedient for lowering the demands on the heart and vessels than fasting, combined with removal of the liquid part of the diet. Molhard makes regular use of this hunger and thirst treatment in high blood pressure of acute diffuse glomerulitis, pregnancy-kidney disease and preeclampsia. Early diagnosis is important; after six weeks of acute nephritis the changes on the vascular loops of the kidneys become irreversible and the chronic course becomes inevitable. Previous removal of the foci of infection (tonsils) is sometimes necessary. In all chronic forms of high blood pressure fasting represents a sovereign mode of treatment, moderated through the use of fruit and vegetable juice. Only the most serious cases of malignant sclerosis fail to react. Diet poor in salt is important, although it is difficult to carry it through in all its strictness.

The third main theme dealt with focal infection. Pathologist Robert Roessle of Berlin said that to his mind focal infection is a weakened form of a general infection; the most important points of departure are dental granuloma and chronic angina. It is correct to separate focal infection from sepsis, though they are related in essence. Focal infection is to be regarded as a "forme fruste" of sepsis. As Karl Kissling of Mannheim explained in the clinical report following, the connection between chronic foci of infection and certain diseases should be regarded as assured. The following can safely be regarded as focus-caused diseases: 1. Arthritis, acute as well as chronic, including acute articular rheumatism, rheumatic endocarditis, pericarditis, pleuritis, myocarditis, chorea and myositis. 2. Ischialgia in a small percentage of cases and other diseases behaving like neuritis. 3. Heart and vessel diseases, cardiac valve and muscle diseases as far as they belong to the rheumatic types. Perhaps also phlebitis. 4. Nephritis (action of streptococcic toxin after Volhard). 5. Endocrine disturbances, in particular thyroses. 6. Facultative-allergy conditioned diseases, such as urticaria, many eczemas, dermatoses, and perhaps also bronchial asthma. 7. Several chronic subfebrile conditions and eventually also anemias of unknown etiology. 8. Eventually certain anginous (angina pectoris) disorders.

The last theme of the convention was the deterioration of teeth as a sign of malnutrition. Professor of dentistry Euler of Breslau said that about 90 per cent of the milk teeth of children as well as more than 80 per cent of the remaining teeth of adults are found affected with caries; caries in this proportion is likely to have existed for only a relatively short time. The main cause apparently is the change of nourishment in composition and cooking. The share of vegetables is too small, and bread giving teeth enough work is introduced with difficulty.

BELGIUM

(From Our Regular Correspondent)

Aug. 10, 1939.

Examination of Cotton Mill Workers

M. Thiry reported to the Belgian Association of Social Medicine the results of an inquiry made in the glove industry, in which he examined about 310 cotton mill workers. His attention was directed to the number of persons with hypertrophy of the lymph glands and to the frequency in young persons of hypertension. Hypotension is exceptional, while hypertension is common and at times high. In certain cases this hypertension can be connected with pulmonary sclerosis, with which numerous cotton workers are affected. However, this explanation does not suffice when it concerns young persons not yet afflicted with pulmonary lesions causing trouble to the circulation. He discussed modifications in the sedimentation speed.

Occupational Diseases Affecting Engravers

M. Uytdenhoef read a paper before the Belgian Association of Social Medicine on the examination of 270 employees in certain branches of printing, such as engraving and photogravure work. The maladies observed spring from three prin-

cipal factors: electric arc radiation, acid vapors and cutaneous effects of numerous chemicals, among which turpentine and chromates are mostly to blame.

Leptospirosis at Antwerp

Dr. Van der Walle made a study of a phase of Weil's disease at the Prince Leopold Tropical Institute and published it in the *Nederlandsch tijdschrift voor geneeskunde*. He examined 100 dogs at the Antwerp pound and was able to demonstrate the presence of leptospira antibodies in the blood of forty-four animals. The number of cases in which lysis took place was twice as high for Leptospira canicola as for Leptospira icterohaemorrhagiae. The percentage of infections increased with the age of the animals. Leptospira canicola was cultivated in the kidney of one of the dogs. It was proved that leptospirosis had scarcely any pathogenesis for the guinea pig. Human infection with Leptospira canicola is unknown in Belgium.

COPENHAGEN

(From a Special Correspondent)

Aug. 8, 1939.

The Serum Treatment of Pneumonia

Denmark probably has been ahead of other European countries in profiting from studies on the serum treatment of pneumonia recently conducted in the United States. The credit for being in the van in this field is mainly due to Dr. Thorvald Madsen, who is at the head of the State Serum Institute in Copenhagen and who is endowed with a wide international outlook. Since 1935, with the cooperation of his assistant Dr. N. I. Nissen, he has organized a special department in his institute for the bacteriologic and serologic study of pneumonia. It has been calculated that in the fifteen year period 1921-1936 there have been approximately 10,000 deaths from croupous pneumonia in Denmark, and if to these deaths are added those from pneumococcic bronchopneumonia the count against the pneumococcus is heavy. Investigations have shown that types I, VII and III are responsible for about 64 per cent of all the cases of pneumococcic pneumonia, whereas none of the other types play an important part from a statistical point of view.

Dr. Nissen has undertaken a study of 932 cases of pneumonia given serum treatment. Though these cases represented for the most part severe and moderately severe forms of the disease, and though many cases were included in which the dosage of serum was inadequate or it was given too late, the mortality was no higher than 13.5 per cent. Considering that the pneumonia mortality in Copenhagen between 1935 and 1937 among patients not given serum was between 30 and 40 per cent, this 13.5 per cent represents an achievement. In Dr. Nissen's opinion, chemotherapy and serotherapy should become partners rather than rivals, and he is convinced that in the future and in the cases in which the blood stream is seriously infected by pneumococci of the lower types the best treatment will be a combination of chemotherapy and serotherapy. The serum he prefers is rabbit serum the concentration of which is so high that there are from 4,000 to 6,000 units to every cubic centimeter. He has also succeeded in reducing the cost of serum to such an extent that 200,000 units now cost only about 40 kroner ($8) instead of 350 ($70).

The Prevalence of Gastric Ulcer

There is evidence in Copenhagen and the provinces of a rise, as formidable as it is inexplicable, in the incidence of gastric and duodenal ulceration, notably in men. The most recent study on this subject comes from the town of Aarhus, where Dr. A. Guldager and Dr. F. Heintzelmann have undertaken a survey of the records of all the hospital cases of ulcer hemorrhages treated in the period 1918-1937 inclusive.

To the question whether gastric and duodenal ulceration has increased in frequency in that period, they answer from an analysis of 341 cases that it has. During these twenty years the number of hospital-treated cases of ulcer hemorrhage has been more than quadrupled, whereas the population of Aarhus and the total admissions for nonsurgical diseases to the hospital have each increased by only 30 per cent. Most surprising of all is the change in the sex ratio of ulcer hemorrhage. At the beginning of this twenty year period the ulcer hemorrhages were equally distributed between the sexes, whereas at the end of the period there were from four to six men to every woman. As far as women are concerned, there has been no increase in the ulcer hemorrhage rate. No satisfactory explanation is forthcoming of this phenomenon so unfavorable to the male. It was found that the mortality was 16.3 per cent for patients over 50 and only 2.2 per cent for patients under this age, the total mortality being 6.5 per cent (twenty-two deaths among 341 patients).

Of What Do Lupus Patients Die?

Of lupus itself? Rarely! This is the conclusion to which Dr. C. N. S. Gundtoft has come after undertaking a study of the causes of death of the 211 patients who died after attending the skin department of the Finsen Institute in Copenhagen in the last twenty-five years. Of the dead patients, sixty-five were men and 146 were women. Only four men and six women were reported as having died of lupus itself, the average age of the men being 67 and of the women being 51. The average age of the twenty-one men and forty women reported as having died of pulmonary tuberculosis was 36. There were also four men and three women who died of tuberculous meningitis, and one woman who died of miliary tuberculosis. There were also nine men and seventeen women to whose deaths tuberculosis in some form or other contributed considerably.

It is evident from these figures that, while lupus itself usually runs so benign a course that it seldom proves fatal in itself, other manifestations of tuberculosis, pulmonary tuberculosis in particular, play a most important part as a cause of death. It was noteworthy that in about two thirds of all the fatal cases of pulmonary tuberculosis the disease of the lungs became manifest only a short time after treatment of the lupus had been instituted. In these cases the pulmonary disease often ran a rapidly fatal course and thus favored the suspicion that the lupus may have been a cutaneous manifestation of a latent but very serious form of tuberculosis. Among the patients dying of pulmonary tuberculosis it was common to find that the lupus had healed. Indeed, at the Finsen Institute it has become a current saying that, when pulmonary tuberculosis is active, the chances of the lupus being rapidly cured are enhanced. About half (107 patients) died from nontuberculous diseases, which in twenty-four cases were cancers. Heart disease accounted for nine deaths and pneumonia and bronchopneumonia for fifteen. There were also eight deaths due to senile decay, whatever that may mean. These figures suggest that if the lupus patient can avoid death from tuberculosis he has a good chance of living to a ripe old age.

Marriages

CHARLES BURDIS DAVIS JR. to Miss Margaret MacRae Williams, both of Wilmington, N. C., July 15.

WILLIAMS DEAN STEWARD, Augusta, Ga., to Miss Martha Frances Boyd of Chattanooga, Tenn., in June.

TAYLOR C. GILBERT, Dallas, Texas, to Miss Edyth Erhard of Temple in Albuquerque, N. M., recently.

WILLIAM J. KUCEWICZ, Thompsonville, Conn., to Miss Mary Emma Newsome of Arcadia, Fla., recently.

THADDEUS ANTHONY TIMMONS, Lake City, S. C., to Miss Margaret Allen in St. Matthews, July 3.

JAMES GIBSON SMITH, Birmingham, Ala., to Miss Ruth Niskern in St. Cloud, Minn., in June.

BAYARD M. KELLER, Cuyahoga Falls, Ohio, to Miss Jean Spellman of Williamsfield, June 15.

Deaths

Vernon Lawrence Treynor ✠ Council Bluffs, Iowa; State University of Iowa College of Medicine, Iowa City, 1891; member of the House of Delegates of the American Medical Association from 1934 to 1937 and in 1939; past president and secretary of the Iowa State Medical Society; for many years a member of the board of regents of the State University of Iowa; formerly county coroner; on the staff of the Jennie Edmundson Hospital; president of the Physicians Casualty Association of America; aged 72; died, June 12, of heart disease and arteriosclerosis.

Thomas Richard Sealy ✠ Santa Anna, Texas; University of Texas School of Medicine, Galveston, 1904; fellow of the American College of Surgeons; formerly councilor of the Fourth District of the State Medical Association of Texas; served during the World War; formerly health officer and president of the school board; medical director and superintendent of the Sealy Hospital; aged 59; died, June 15, of cirrhosis of the liver.

William Seevers McDannald, Tenafly, N. J.; Medical College of Virginia, Richmond, 1909; member of the Medical Society of New Jersey; for many years a member of the medical board of the Englewood Hospital and attending physician in the antepartum clinic of the outpatient department; served during the World War; formerly school physician; aged 65; died, June 23, in Hot Springs, Va., of cardiorenal disease.

Fred Willard Powers, Waterloo, Iowa; State University of Iowa College of Medicine, Iowa City, 1889; in 1905 member of the House of Delegates of the American Medical Association; member of the Iowa State Medical Society; formerly bank president and member of the state board of health; past president of the state board of medical examiners; aged 71; died, June 16, of cerebral thrombosis.

Anson Mayes Cameron, Chicago; Hahnemann Medical College and Hospital of Philadelphia, 1900; member of the Illinois State Medical Society; formerly professor of pediatrics at the Hahnemann Medical College and Hospital, Chicago; served during the World War; aged 65; died, June 20, in Delavan Lake, Wis., of coronary thrombosis and arteriosclerosis.

Frederick James Mann, Darien, Conn.; University of Buffalo School of Medicine, 1893; formerly secretary of the Dutchess County (N. Y.) Medical Society; at one time physician to the city schools of Poughkeepsie, N. Y.; formerly on the staff of the Westport (Conn.) Sanitarium; aged 68; died, June 23, in Berkeley, Calif., of coronary thrombosis.

Joseph Mark Walsh, Rapid City, S. D.; University of Illinois College of Medicine, Chicago, 1905; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; for many years member of the board of education; aged 61; died, June 26, of bronchogenic carcinoma of the lung.

William Frederic Schroeder ✠ Newton, Kan.; Rush Medical College, Chicago, 1922; served during the World War; county health officer; past president and secretary of the Harvey County Medical Society; on the staff of the Bethel Deaconess Hospital; aged 48; was killed, June 12, in an automobile accident.

Edward Oswald Schaaf, Newark, N. J.; Bellevue Hospital Medical College, New York, 1894; Medizinische Fakultät der Universität Wien, Austria, 1896; music composer, arranger and interpreter; aged 69; died, June 25, in the Presbyterian Hospital of uremia, abscess of the liver and diverticulitis of the colon.

Irwin Sherwood Altman, Buffalo; University of Buffalo School of Medicine, 1934; member of the Medical Society of the State of New York; assistant in medicine at his alma mater; aged 29; on the staff of the Buffalo General Hospital, where he died, June 9, of acute nonspecific ulcerative colitis.

William Thomas Sharp, Farmington, Tenn.; University of Nashville Medical Department, 1889; member of the Tennessee State Medical Association; past president of the Bedford County Medical Society and the Marshall County Medical Society; aged 70; died, June 18, of cholecystitis.

Andrew Alexander McKay, Midland, Mich.; Detroit College of Medicine, 1894; past president of the Manistee County Medical Society; formerly on the staff of the Mercy Hospital, Manistee; served during the World War; aged 66; died, June 3, of cerebral hemorrhage.

Spencer Carleton, New York; Columbia University College of Physicians and Surgeons, New York, 1898; formerly associate professor of materia medica at the New York Medical College and Flower Hospital; aged 65; died, July 11, at his home in Flushing, N. Y.

Robert S. Taggart, New Washington, Ind.; University of Louisville (Ky.) Medical Department, 1893; member of the Indiana State Medical Association; aged 69; died, June 10, in St. Joseph Infirmary, Louisville, of infection of the prostate and renal insufficiency.

Millicent Mary Augusta Cosgrave, New York; Cooper Medical College, San Francisco, 1902; at one time assistant clinical professor of medicine in the department of pediatrics, Stanford University School of Medicine, San Francisco; aged 70; died, June 24.

George Phillips Reynolds ✠ Boston; Harvard Medical School, Boston, 1924; instructor in medicine at his alma mater; formerly secretary of the Suffolk District Medical Society; junior visiting physician to the Boston City Hospital; aged 41; died, June 6.

Isadore J. Pass, Macon, Ga.; University of Minnesota Medical School, Minneapolis, 1932; member of the Medical Association of Georgia; on the staff of the Macon Hospital; aged 30; died, June 9, of injuries received in an automobile accident.

Aaron Levy ✠ St. Louis; Missouri Medical College, St. Louis, 1897; at one time assistant professor of children's diseases, St. Louis University School of Medicine; aged 63; formerly on the staff of the Jewish Hospital, where he died, June 18.

Thomas Lee McDonald ✠ Hope, Ark.; Memphis (Tenn.) Hospital Medical College, 1910; formerly secretary of the Hempstead County Medical Society; aged 50; died, June 26, of injuries received in an automobile accident in Stephenville, Texas.

Ira McKinney ✠ Champaign, Ill.; Chicago College of Medicine and Surgery, 1916; served during the World War; on the staff of the Burnham City Hospital; aged 46; died, June 10, in the Presbyterian Hospital, Chicago, of carcinoma of the penis.

Joseph B. Seaman, Mishawaka, Ind.; Medical College of Indiana, Indianapolis, 1900; member of the Indiana State Medical Association; on the staff of the St. Joseph Hospital; aged 74; died, June 3, of rupture of an aneurysm of the abdominal aorta.

Herbert L. Newell, East Randolph, Vt.; University of Vermont College of Medicine, Burlington, 1886; member of the Vermont State Medical Society; aged 78; died, June 8, in the Gifford Memorial Hospital, Randolph, of acute pancreatitis.

John William Worrell, Pittsburgh; University of Pennsylvania Department of Medicine, Philadelphia, 1881; member of the Medical Society of the State of Pennsylvania; aged 82; died, June 11, in Atlantic City, N. J., of coronary thrombosis.

Louis Sims Oppenheimer, Tampa, Fla.; Louisville (Ky.) Medical College, 1875; member of the Florida Medical Association; past president of the Hillsborough County Medical Society; aged 85; died, June 12, of heart disease.

Adam Hale Oliver, Edwardsville, Ill.; Washington University School of Medicine, St. Louis, 1893; member of the Illinois State Medical Society; aged 74; died, June 1, of chronic nephritis and fracture of a hip received in a fall.

Henry Tipton Byars, Caruthersville, Mo.; Jefferson Medical College of Philadelphia, 1886; past president of the city board of health and formerly mayor; for many years member of the board of education; aged 79; died, June 5.

Carl Lane Cline, Dayton, Ohio; Hahnemann Medical College and Hospital of Philadelphia, 1901; member of the Ohio State Medical Association; served during the World War; aged 62; died, June 22, of chronic pancreatitis.

John Jacob Osterhout, Belleview, Mo.; Albany (N. Y.) Medical College, 1898; served during the World War; aged 62; died, June 4, in the Veterans Administration Facility at Jefferson Barracks of coronary sclerosis.

Edward Schulz, St. Louis; Homeopathic Medical College of Missouri, St. Louis, 1904; member of the Missouri State Medical Association; aged 68; died, June 28, at his summer home in St. Clair, Mo., of carcinoma.

George William Mengersen, Chicago; Chicago College of Medicine and Surgery, 1909; member of the Illinois State Medical Society; aged 57; died, June 19, of chronic myocarditis at his summer home in Grafton, Ill.

Jacob Siewert Weber ✠ Davenport, Iowa; Rush Medical College, Chicago, 1901; formerly bank president; on the staffs of the Mercy and St. Luke's hospitals; aged 62; was found dead, June 2, of coronary occlusion.

Thaddeus Parker, Broadmoor, Colo.; Michigan College of Medicine and Surgery, Detroit, 1891; member of the Colorado State Medical Society; aged 70; died, June 17, of injuries received in an automobile accident.

Horace N. Abernethy, Charlotte, N. C.; Louisville (Ky.) Medical College, 1894; member of the Medical Society of the State of North Carolina; aged 74; died, June 10, in Denver, N. C., of cerebral hemorrhage.

Oscar Kemper Mohs, San Francisco; University of California Medical School, San Francisco, 1920; member of the California Medical Association; aged 46; was killed, June 11, in an automobile accident.

Ellsmore Stites, Bridgeton, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1892; for many years member of the board of health; aged 72; died, June 1, of chronic nephritis.

Robert Albert Warner ✠ Baltimore; University of Maryland School of Medicine, Baltimore, 1895; formerly served with the U. S. Veterans Bureau; aged 67; died, June 7, of carcinoma of the rectum.

Samuel Leroy Rea ✠ Ukiah, Calif.; Cooper Medical College, San Francisco, 1896; past president and secretary of the Mendocino County Medical Society; aged 64; died, June 8, of chronic myocarditis.

William Waddell Meloy, Chicago; Rush Medical College, Chicago, 1897; served during the World War; aged 65; died, June 19, in the Washington Boulevard Hospital of carcinoma of the prostate.

Allyn Cilley Poole ✠ Cincinnati; Medical College of Ohio, Cincinnati, 1887; aged 78; on the staff of the Christ Hospital, where he died, June 27, of cerebral thrombosis and prostatic hypertrophy.

James Richard Thompson, Manchester, Tenn.; Vanderbilt University School of Medicine, Nashville, 1879; aged 91; died, June 12, as the result of injuries received in an automobile accident.

De Witt Clinton Romaine ✠ New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1881; aged 82; died, June 1, of arteriosclerosis.

Thaddeus Walker, Grosse Pointe, Mich.; Detroit College of Medicine, 1893; member of the Michigan State Medical Society; veteran of the Spanish-American War; aged 69; died, June 13.

Archer Clifton Jacobs, Elmore, Minn.; Minnesota Hospital College, Minneapolis, 1886; member of the Minnesota State Medical Association; aged 86; died, June 28, of heart disease.

Francis Albert Scott, Rochester, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1899; aged 73; died, June 25, of chronic pulmonary tuberculosis.

Samuel Grover Phillips, Denver; Kansas City (Mo.) Hahnemann Medical College, 1910; member of the Colorado State Medical Society; aged 76; died, June 1, of cerebral hemorrhage.

Joseph J. Moncrief, Little Rock, Ark.; Arkansas Industrial University Medical Department, Little Rock, 1897; aged 81; died, June 11, in the Baptist Hospital of coronary sclerosis.

Joseph John Pelletier, Lewiston, Maine; Medical School of Maine, Portland, 1901; member of the Maine Medical Association; aged 59; died, June 4, of chronic myocarditis.

Valentine Trant McGillycuddy, Berkeley, Calif.; Detroit Medical College, 1869; aged 90; died, June 6, in the Alta Bates Hospital, of cerebral hemorrhage and arteriosclerosis.

Grace Melville Bliss Du Vall, Fairbury, Neb.; Central Medical College of St. Joseph, Mo., 1902; aged 59; died, June 17, of chronic myocarditis and bronchopneumonia.

William P. Rothwell ✠ Pawtucket, R. I.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1892; aged 73; died, June 14, in the Memorial Hospital.

John Pompey Thomas, Detroit; Meharry Medical College, Nashville, Tenn., 1928; on the staffs of the Edyth K. Thomas and Parkside hospitals; aged 40; died, June 26.

Lillian Irvine Pollock, Denver; Denver Homeopathic College, 1897; aged 83; died, June 11, of intracapsular fracture of the left hip joint and diabetes mellitus.

Clyde Clifford Winter, Farmington, Mo.; St. Louis College of Physicians and Surgeons, 1906; aged 60; died, June 30, in the Missouri Baptist Hospital, St. Louis.

Amon Peter Flaten ✠ Yuma, Colo.; Rush Medical College, Chicago, 1919; on the staff of the Yuma Community Hospital; aged 48; died, June 4, of heart disease.

Mary E. McClain Neptune, Loudonville, Ohio; Woman's Medical College of Pennsylvania, Philadelphia, 1897; aged 71; died, June 26, of cerebral hemorrhage.

William Hervey White, Akron, Ohio; Western Reserve University Medical Department, Cleveland, 1903; aged 64; died, June 25, in the Akron City Hospital.

Jacob H. C. King, Hot Springs National Park, Ark.; Arkansas Industrial University Medical Department, Little Rock, 1889; aged 78; died, June 5.

Sam H. Cannady, Oxford, N. C.; University of Virginia Department of Medicine, Charlottesville, 1887; aged 72; died, June 22, of chronic nephritis.

Ewing S. Moad, Blue Springs, Mo.; Missouri Medical College, St. Louis, 1882; aged 79; died, June 21, of chronic nephritis and endarteritis obliterans.

Thomas Olearius Whitacre ✠ Bowling Green, Ohio; Rush Medical College, Chicago, 1906; formerly mayor; aged 65; died, June 19, of heart disease.

Henry Elsworth Phares, Shelbyville, Ind.; Hospital College of Medicine, Louisville, Ky., 1897; formerly county health officer; aged 68; died, June 26.

Justus Vanculen White, Decatur, Ill.; Rush Medical College, Chicago, 1900; served during the World War; aged 66; died, June 21, of heart disease.

Walter Harry Ross, Winter Haven, Fla.; Marion-Sims College of Medicine, St. Louis, 1893; aged 67; died, June 8, in the Winter Haven Hospital.

George W. Pearson, Manchester, Tenn.; Vanderbilt University School of Medicine, Nashville, 1882; aged 86; died, June 8, of bacillary dysentery.

James P. Masterson ✠ Mauriceville, Texas; Memphis (Tenn.) Hospital Medical College, 1893; aged 69; died in June of coronary occlusion.

Reuben Newton Mayfield, Seattle; Long Island College Hospital, Brooklyn, 1880; Rush Medical College, Chicago, 1883; aged 80; died, June 17.

Thomas Richardson Morehead, Mertzon, Texas; Dallas Medical College, 1904; aged 64; died, June 2, of cerebral hemorrhage and hypertension.

John Augustine Riley, Chicago; Rush Medical College, Chicago, 1895; aged 71; died, June 20, of cerebral thrombosis and arteriosclerosis.

Evlan Sargent, Moline, Ill.; Northwestern University Medical School, Chicago, 1898; served during the World War; aged 68; died, June 4.

W. P. Roberts, Lexington, Ky.; Pulte Medical College, Cincinnati, 1888; aged 70; died, June 19, of arteriosclerotic heart disease.

John A. Van Amburg, Lutesville, Mo.; Missouri Medical College, St. Louis, 1886; aged 78; died, June 15, of chronic cholecystitis.

John Alex Meldau, McClellanville, S. C.; Kentucky School of Medicine, Louisville, 1892; aged 80; died, June 17, of cerebral hemorrhage.

John F. Turner, Canton, S. D.; Baltimore Medical College, 1893; aged 72; died, June 21, following an operation on the prostate.

Gilbert Cannon, Almonte, Ont., Canada; McGill University Faculty of Medicine, Montreal, Que., 1877; aged 84; died, June 24.

Alfred S. Mattson, San Francisco; Hahnemann Medical College and Hospital of Philadelphia, 1880; aged 79; died, June 10.

Frederick Leven Wright, Oakland, Calif.; University of Louisville (Ky.) Medical Department, 1892; aged 70; died, June 12.

Henry Clay Ruhl, New York; Columbia University College of Physicians and Surgeons, New York, 1898, aged 64; died, June 13.

John Sutherland Wright, Edmonton, Alta., Canada; University of Toronto Faculty of Medicine, 1897; aged 75; died in June.

Henry Siff, Brooklyn; University of the City of New York Medical Department, 1893; aged 77; died, June 19, of heart disease.

Grace Marvin, Watertown, Mass.; Boston University School of Medicine, 1890; aged 74; died, June 12, of heart disease.

Monroe Patterson, Eudora, Ark.; University of Michigan Medical School, Ann Arbor, 1915; aged 53; died, June 11.

Arthur E. Roth, Chicago; Harvey Medical College, Chicago, 1901; aged 71; died, June 24.

Bureau of Investigation

THERMO-MAGNETIC CUSHION FRAUD

W. E. Holder's Device Is Debarred from the Mails

A Chicago concern doing business under the names Chicago Thermo-Magnetic Cushion Company and Holder's Health-Aids, Inc., was debarred from the mails by a fraud order issued against it by the Post Office Department on Dec. 23, 1938. Included in the order were Ruby E. Morgan, secretary, and "Dr." W. E. Holder, president.

This group advertised and sold through the mails a rubber chair cushion containing an electrical unit with connections. It was represented in some of the advertising to "stop the cry

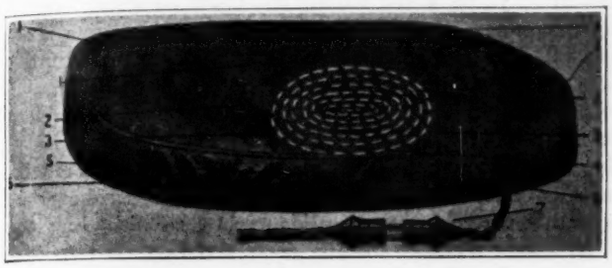


Illustration (reduced) of Thermo-Magnetic Cushion.

of those irritated nerves responsible for the pains of menstruation, of enlarged prostate, kidney and bladder troubles, lumbago, sciatica, etc." Also, this "new and simple method applies deep soothing heat to the organs of the pelvis and abdomen." Further advertising claimed:

"The Chicago Thermo-Magnetic Cushion looks like a regular seat cushion. It can be used anywhere—at home or at the office. It is attractive in appearance with its neat leatheroid covering. Its sponge-rubber construction makes it a resilient and very comfortable seat cushion.

"But, concealed inside, near the top, are two specially constructed Electro-Magnetic Coils. They are so placed as to send Thermo-Magnetic Heat Rays through the Perineum or the soft part between the thighs to the Pelvic Organs.

"This cushion is designed to stimulate and increase circulation of blood and of nerve energy in the Pelvic Region where so many vital organs, including the sex glands, prostate, etc., are located—and where sluggish circulation has such a tendency to occur.

"Congestion or abnormal blood circulation in this area brings about such conditions as backaches, menstrual irregularities and pains in women, prostatic and bladder symptoms in men, lumbago, sciatica, rheumatic pains, etc.

"To all sufferers from any such ailments, and their physicians, this message about the Chicago Thermo-Magnetic Cushion, and the relief it can give, is respectfully addressed. . . .

"Science has long known the beneficial effects of the proper application of heat to various parts of the body. Even in the most ancient times some knowledge of this sort was prevalent. But—they naturally knew nothing then about the extraordinary and far-reaching results that can be accomplished through the use of electricity.

"Diathermy—electrically produced heat—has come to be used throughout the world in the treatment of internal organs of the body which would not be otherwise accessible without operation.

"And recently—electro-magnetic and radio-wave heat has been successfully used to conquer even the dread disease of syphilis, by inducing what is called 'artificial fever.'

"Thus science is discovering more and more ways of utilizing this most ancient of natural healing aids for the benefit of mankind. . . .

"The Cushion is so constructed that just the right amount of Filtered Infra-Red Rays and Electro-Magnetism is provided which will penetrate through cotton, wool or silk garments. The patient receives the benefit of these deep-penetrating, life-restoring Forces without experiencing any discomfort and while fully clothed.

"For all pelvic trouble, nervousness, constipation, or general malaise the Cushion will work wonders. Often headaches can be cleared up within an hour or two. It is a natural aid to circulation, a relief to cold feet and legs, and a preventative of colds and many other illnesses to which mankind is heir."

In the memorandum that Hon. Vincent M. Miles, Solicitor for the Post Office, sent to the Postmaster General, recommending the issuance of a fraud order, he brought out these facts: That a qualified physician who tested the device found that when used as directed it raised the temperature of the external surface of the skin directly over the heating unit 1½ degrees above normal; that the pulse rate was not changed and the temperature of the patient taken under the tongue was normal, indicating no rise in body temperature; and the therapeutic effects of the device were essentially the same as those of an ordinary electric heating pad or a hot water bottle containing water heated to 120 degrees Fahrenheit.

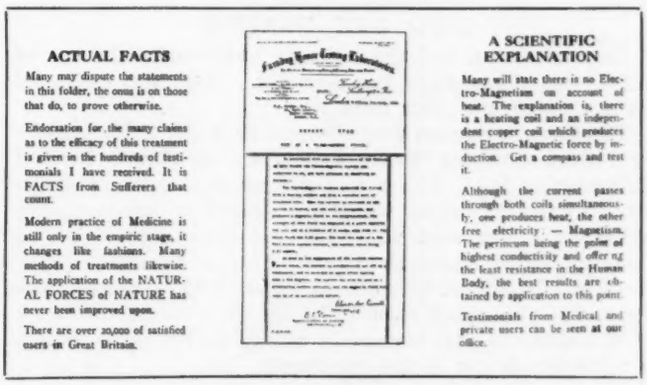
That a test of the device with magnets showed that, though there was a slight magnetic field surrounding the heating unit, medical evidence proved that the magnetic effects produced by it exerted no beneficial results whatever on human tissues. It was shown that the small amount of infra-red rays emitted by the cushion in question in the form of radiant energy would be practically stopped by the covering of the heating unit and the leatheroid covering of the cushion itself; and that even if these rays did strike the skin they would penetrate only a very short distance and their effects would be lost in the normal processes of heat regulation carried on by the body through the flow of the blood and lymph.

That the cushion would not and could not remove the causes of all bodily ailments as claimed and would have no value in the treatment and cure of stomach and digestive troubles, rheumatism, lumbago, sciatica, prostatic conditions, colds and neuritis, except possibly for slight palliative effects in some few cases.

That the use of this cushion for the treatment of syphilis would be worse than useless, as it might permit the disease to reach a point where it would be beyond proper care.

The memorandum stated, further, that no physicians were connected with the business, though it had one A. Mercer Parker, who claimed to be a "drugless healer." Parker is listed under "Chiropractors" in the current Chicago telephone directory. In November 1938 a letter bearing his signature was sent out in which he offered to demonstrate to a teacher of singing his "natural corrective methods for relaxing excess tension and relieving irritations," which methods he described as "brilliant and lasting in their results."

From the Solicitor's memorandum one learns also that Parker entered this Chicago cushion outfit in 1937, after W. E. Holder, who had started it in 1936, had run it for a year. In June 1937 a Chicago newspaper reported the incorporation of "Holder's Health Aids, Inc.," to "sell, manufacture electro-medical appliances such as Holder's Thermo-Magnetic Cushion." Holder and Parker were two of the incorporators named.



ACTUAL FACTS

Many may dispute the statements in this folder, the onus is on those that do, to prove otherwise.

Endorsation for the many claims as to the efficacy of this treatment is given in the hundreds of testimonials I have received. It is FACTS from Sufferers that count.

Modern practice of Medicine is still only in the empiric stage, it changes like fashions. Many methods of treatments likewise. The application of the NATURAL FORCES of NATURE has never been improved upon.

There are over 20,000 of satisfied users in Great Britain.

A SCIENTIFIC EXPLANATION

Many will state there is no Electro-Magnetism on account of heat. The explanation is, there is a heating coil and an independent copper coil which produces the Electro-Magnetic force by induction. Get a compass and test it.

Although the current passes through both coils simultaneously, one produces heat, the other free electricity. — Magnetism. The perineum being the point of highest conductivity and offering the least resistance in the Human Body, the best results are obtained by application to this point.

Testimonials from Medical and private users can be seen at our office.

Reproduction (reduced) of some of the Holder advertising.

In some of the advertising Holder claims that he originated the Thermo-Magnetic Cushion in 1930 at the suggestion of a circle of friends who met regularly in a London club. To quote:

"In this particular group which the writer was a member there were a Gynecologist, M.D.; a Neurologist, M.D.; a Specialist in Rectal Disorders, M.D.; a Oculist, M.D.; a Radiologist; a Osteopath and the writer who is a re-search Medical Electrologist."

Holder goes on to say that when these practitioners had tried out the device in a variety of cases they became enthusiastic over the results, and, to quote further from Holder's careless writing:

"Since that time hundreds of British Medical men have purchased Holder's Thermo-Magnetic Cushion and recommended them to their patients. Up to the present time there are over 20,000 satisfied users in Great Britain and Dominions, there are a few in U. S. A. which have

been purchased by visitors who have brought them back, in fact, I was invited to come to U. S. A. five years ago to supervise the making of the Thermo-Magnetic Cushion but owing to being busy in perfecting my Short-Wave Condensator. I could not leave England, having now perfected that I decided to come to Chicago where the Cushion is being made, therefore, you have the privilege of purchasing Holder's Thermo-Magnetic Cushion at a less price than sold in England."

The form letter from which the foregoing is quoted was signed in facsimile typewriting "Dr. W. E. Holder, Fellow Int. Faculty of Sciences (London)." A search through all available sources failed to show that Holder is a graduate of any medical school in the British Isles or in this country, or that he is licensed to practice medicine anywhere. The high-sounding society of which he claims to be a fellow declared in a letter in which it solicited a nonmedical man in Chicago for membership that it had been "established for the purpose of federating all branches of Science into one united world organization." This was in 1932 and, if the organization had succeeded in its purpose and had made any mark in the world of science, undoubtedly the American Medical Association would have known a good deal about it by this time but has not.

The Chicago man who was solicited for membership received a circular giving the names of the officers of the organization. Strangely enough, the only one who could be found listed in the British "Who's Who" was an American (named as one of the vice presidents), a professor in an Iowa college. An inquiry sent to him brought the reply that he had been a member only a short time and had been able to find out very little about the movement!

On Aug. 10, 1938, the Federal Trade Commission entered a complaint against the Chicago Thermo-Magnetic Cushion Company and A. Mercer Parker, described as "an officer of the company who controls and directs its sales policies and business affairs." Parker and the concern were charged with representing that their device would cure constipation, colds, rheumatism, lumbago, neuritic conditions, stomach and prostate troubles and other ailments. Apparently this case had not been concluded by the time the Post Office Department issued its fraud order against the concern on Dec. 23, 1938, debarring from the mails the Chicago Thermo-Magnetic Cushion Company, Ruby E. Morgan, Secretary, Holder's Health-Aids, Inc., W. E. Holder, President, and their officers and agents as such.

TWO SEX FRAUDS

Two minor but indecent swindles were denied the use of the United States mails last September. One was conducted from Chicago, the other from New York City.

The Chicago concern was promoted by Bernard Moses, who used the trade-styles "Bermo Laboratory, Inc.," and "Bernard Laboratories, Inc." Moses sold through the mails a preparation he called "Retardo," which was claimed to cure premature ejaculation. The stuff was advertised under such claims as "Staying Power Increased. Greater Thrills. Less Disappointment and Embarrassment due to Prematurity." Retardo was found by government chemists to be an ointment containing local anesthetics that was to be applied to the glans penis a few minutes before sexual intercourse.

Moses, who obtained his dupes by advertising in "various publications," claimed to be a registered pharmacist of the state of Illinois. The sale of Retardo was declared to be a fraud and was debarred from the mails Sept. 1, 1938.

The New York swindle in the same field was conducted by one Jacob Weitz, who used among other trade-styles the name "Jacques Products Company." Weitz's preparation was named "Excello-Jel" and, like Retardo, was a lanolin ointment containing local anesthetics. Like it also Excello-Jel was sold as a cure for premature ejaculation. In addition Weitz sold "J. P. Tone-Up-Nerve-Tabs," which was said to be a cure for lost sexual vigor—thus working both sides of the street! The last-named product consisted of tablets containing milk sugar and small quantities of strychnine and zinc phosphide, with minute traces of iron and calcium. On Sept. 15, 1938, the Jacques Products Company was declared a fraud and debarred from the United States mails.

Correspondence

POLIOMYELITIS AND TONSIL OPERATIONS

To the Editor:—For some time I have noted with concern articles which attempt to connect the avenue of infection of poliomyelitis, at present unknown, with the surgical removal of adenoids and tonsils. To foster such ideas, directly or indirectly, which long experience on the part of practically all nose and throat men over the United States in no way bears out, is to do harm to countless children who need tonsillectomy.

Considering that operations for tonsillectomy and adenectomy number possibly one fourth of all major operations that are performed yearly in the country and under all sorts of varying conditions and circumstances, one could well promote almost any idea, however untrue or remote, by citing the occurrence of a few sporadic cases. The removal of adenoids and tonsils, when necessary, is so important in the welfare of children that attempts to raise doubts and issues not clearly proved is to do great harm rather than good. Because a few cases of poliomyelitis occurring in summertime may have appeared after any operation, whatever that operation might accidentally have been, is no reason whatever to raise doubt and fear. If there is an epidemic of poliomyelitis in one's own community, any wise physician under these exceptional circumstances should easily recognize what is the best procedure to adopt. The summertime during the long vacation period is a good time for the removal of tonsils and adenoids in school children and should be consistently encouraged.

HENRY G. LANGWORTHY, M.D., Dubuque, Iowa.

A NEW DIPHTHERIA ANTITOXIN

To the Editor:—Your attention is called to an editorial comment entitled "A New Diphtheria Antitoxin" in THE JOURNAL, July 22, page 326.

This comment discusses results obtained by Pope by means of peptic digestion of diphtheria antitoxic serum and does not give credit to Parfentjev, who first published the description of a successful method of refining diphtheria antitoxin using peptic digestion.

A recent routine batch of diphtheria antitoxin processed by Parfentjev's peptic digest method contained at least 9,000 units per cubic centimeter and approximately 50,000 units per gram of protein. The potency referred to by Pope was 27,000 units per gram of protein.

The antitoxin discussed by Pope has many of the same desirable characteristics as that processed by Parfentjev, because Pope used a method of carefully controlled peptic digestion similar to that previously described by Parfentjev. Antitoxin prepared by the Parfentjev method had been available as "Diphtheria Antitoxin (globulin modified) Lederle," with the approval of the Council on Pharmacy and Chemistry of the American Medical Association, for more than two years before the issue of the Pope article.

Dr. Parfentjev's procedure is described in U. S. Patent No. 2,065,196, issued Dec. 22, 1936. This was referred to by Pappenheimer and Robinson in a paper entitled "Quantitative Study of Ramon Diphtheria Flocculation Reaction" in the *Journal of Immunology* **32**:291 (April) 1937, and by Zinsser, Enders and Fothergill in "Immunity—Principles and Application in Medicine and Public Health," fifth edition, 1939, page 172. (Pappenheimer's article was referred to by Pope.)

S. D. BEARD, Pearl River, N. Y.
Director, Lederle Laboratories.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

SUSCEPTIBILITY TO FLEA AND MOSQUITO BITES

To the Editor:—**All the fleas and mosquitoes in our neighborhood concentrate on me and rarely, if ever, bite my wife. One of my friends states that his wife attracts fleas only, while he is "eaten alive" by mosquitoes and does not remember ever having had a flea bite. Do you know of any explanation for this?**

M.D., California.

ANSWER.—In an article entitled Flea Antigen in Prevention of Flea Bites, Cherney, Wheeler and Reed (*Am. J. Trop. Med.* **19**:327 [July] 1939) state: "It is well known that there is some form of 'immunity' or resistance to insect bites. California, and particularly the San Francisco Bay region, abounds in fleas which do not encroach on the rights of most of the local population but which are a source of great misery to many newcomers until they acquire an 'immunity.' This usually takes from several months to several years, and in rare instances is never acquired. . . . A similar situation holds true in mosquito districts. Again it is newcomers who suffer most." These authors conclude: "There is definite evidence of some sort of 'immunity' to flea bites, and the fleas' selection of their victims is not a matter of chance."

The nature of this "immunity" is not clear. It is perhaps only analogous to bacterial immunity and is associated with an allergic reaction and a process of desensitization. The situation needs serious study. It is possible to desensitize with flea extracts against the reaction to flea bites, and this desensitization seems to be accompanied by a decrease in the bite rate.

DECAPITATION AND CONSCIOUSNESS

To the Editor:—**In the July 10 issue of *Life* magazine are a series of pictures of the decapitation of Wiedman. Can you give me an account of just what processes take place after such an execution? How long do the head and body live after separation? I notice that immediately after the blade falls the body is dumped into a waiting basket; presumably the head is thrown in too. I have seen this in the case of chickens, in which respiratory movements continue for nearly a minute; the body of the chicken jumps about and, in one case, stood up on the feet only to fall again, while the eyes were seen to blink and the mouth to open and close several times as in suffocation. Somewhere I have read of the case in which the victim stood up after the ax had fallen and boxed the ears of the executioner. I would appreciate authentic information on this point. No books seem to mention anything about it.**

M.D., New York.

ANSWER.—There has been much speculation as to the possibility of conscious processes going on in the human brain after the head is suddenly separated from the body by the usual processes of decapitation. The only available record of observations to determine the existence or nonexistence of consciousness in a decapitated head seems to have appeared first in the *Républicain orléanais*, June 27, 1905, and is republished in The Underworld of Paris by Morain (The Underworld of Paris: Secrets of the Sûreté, Alfred Morain, C.B.E., Préfet de Police of Paris, London, Jarrolds, 1931, pp. 300-302). The authenticity of this record is implied by the fact that Morain's attention was called to it by Monsieur Deibler, executioner in chief of arrested criminals.

In this case, according to the report, when the prisoner's head fell into the tray placed before the guillotine Dr. Beaurieux, with the permission of the public prosecutor, took the severed head between his hands and called out the name of the man whose head it was. According to the report, the eyelids opened and the two eyes gave a long stare into those of Dr. Beaurieux. Then the lids fell. A second time the doctor called the name, the eyelids were raised and the eyes stared into those of the doctor. Again they closed. A third time the doctor called the name, but there was no response. The experiment, says the report, lasted thirty seconds, during which time the decapitated head quite certainly preserved conscious life. A similar report appeared at the time in *Le journal*. According to that report, however, Dr. Beaurieux not only called the name of the prisoner but asked "Do you hear me?" *Le journal* indicates that physicians other than Dr. Beaurieux were present and says that they came to the conclusion that vital perception lasted no longer than ten seconds after the execution.

There appear to be no direct experiments on the subject, such as might be done with the aid of the new technic of registering the so-called brain waves. However, the following facts indicate fairly conclusively that conscious processes in the brain of man cease almost simultaneously with the severance of the head from the body:

1. The brain of man is so dependent on oxygen in the arterial blood and the continued removal of carbon dioxide and other wastes by the capillary circulation in the brain that a few seconds of complete inhibition of the heart produces unconsciousness and fainting. Circulation of blood in the brain stops at once with the severance of the head.

2. A blow directed toward any part of the head, even not severe enough to break any bones of the skull or jaw ("the knockout blow") is known to produce unconsciousness of various duration, even without much disturbance of the circulation in the brain, although the most recent investigation of the problem on dogs indicates that the momentary stoppage or slowing up of the circulation in the brain may actually be the cause of this type of unconsciousness. In beheading a man, the jar to the skull and its content from the ax or guillotine crushing or severing the atlas or one of the cervical vertebrae is in all probability as severe as any knock-out blow.

3. The movements of tongue, jaw, facial muscles, eyelids or pupils that may occur after beheading are in all probability due to stimulation of the lower reflex centers in the brain by the state of asphyxia and in no wise indicate conscious processes.

4. In the case of lower vertebrates (birds, reptiles, frogs and fishes) in which the brain is less immediately dependent on the oxygen of the arterial circulation, it is known that ordinary reflexes can be elicited through the brain of the severed head for several minutes after such severance. But the correspondent is mistaken in his description of the behavior of the decapitated chicken. If the head of the chicken is actually severed completely below the medulla, breathing movements stop at once and forever. Irregular muscular movements of legs and wings continue for a few minutes, but the truly decapitated chicken is unable to stand or jump or fly in the accepted physiologic meaning of these terms. These movements in the decapitated body are in all probability induced primarily by asphyxial stimulation of the centers in the spinal cord. If the decapitation in the case of the chicken is improperly made, leaving the midbrain and the medulla still attached to the neck and body, such behavior as described may occur for a few seconds, and respiratory movements really do persist. But this is not true decapitation.

In summary: All available biologic and medical evidence indicates that conscious processes in the human brain cease practically simultaneously with the severance of the head from the body.

DERMATITIS FROM ORTHODICHLOROBENZENE

To the Editor:—**I have a case of occupational dermatitis in which orthodichlorobenzene of synthetic varnish is the exciting factor. Can you give me any references to the subject**

F. E. Clark, M.D., Ogdensburg, N. Y.

ANSWER.—In synthetic varnishes containing orthodichlorobenzene, other constituents and in particular the synthetic resin base may be more provocative of dermatitis than the orthodichlorobenzene itself. In the absence of the results of patch tests or other similar diagnostic procedures, final acceptance of orthodichlorobenzene as the exciting factor should not be made. In the somewhat meager literature on the toxicity of chlorinated benzenes, scant reference may be found to any action on the skin. Nevertheless this industrial solvent may be regarded as a source of dermatitis if for no other reason than because of its capacity to remove the normal surface fat of the skin. In this respect its action may be like that of carbon tetrachloride, a somewhat similar chlorinated hydrocarbon. Some synthetic resins entering varnishes are well known irritants of the skin, as described by Schwartz (Dermatitis from Synthetic Resins and Waxes, *Am. J. Pub. Health* **26**:586, 1936). The toxicity of orthodichlorobenzene is described in the following articles, which in turn contain references to other publications:

1. Medical Research Council Report No. 80, "Toxicity of Industrial Organic Solvents" (His Majesty's Stationery Office, London, 1937), cites the Porton investigation of 1928, which concluded that orthodichlorobenzene was too toxic for use as a paint solvent.

2. Special Development Bulletin No. 18 (1932) of the Dow Chemical Company, Midland, Mich., reports that the toxicity on comparison with carbon tetrachloride is on the order of 2.5 to 1.

3. Zangger (*Arch. Gewerbepath. Gewerbehyg.* **1**:109 [Feb. 14] 1930) states that orthodichlorobenzene is less likely to produce

intoxication by inhalation than trichlorethylene. Volatility, however, is not a factor of importance when the cutaneous contact is with the liquid material.

4. Flury and Zernik (Schadliche Gase, Berlin, Julius Springer, 1931) summarize the toxicity of this chlorinated benzene and refer to the work of Koelsch (Handbuch der sozialen Hygiene, vol. 2, 1926) for extensive information.

5. With further reference to dermatoses from synthetic resins, reference is made to the work of Dolgoff (*Arch. f. Gewerbepath. u. Gewerbehyg.* **4**:643, 1933).

ATHREPSIA IN INFANT

To the Editor:—**A 2 months old baby girl who had been ill about six days had been seemingly doing well on a home-improvised formula of evaporated milk, karo and water. At first the mother thought the child had "the flu," as she began to act fretful and to have a fever and diarrhea. It rapidly became worse and in spite of the use of home remedies (aspirin, castor oil and the like) the fever and diarrhea became much worse. When I first saw the infant she had a rectal temperature of 104.4 F., and was passing liquid greenish foul stools every few minutes. She was apathetic, dried out and ill appearing so was hospitalized at once. On admission, in addition to these manifestations, the rectum was highly irritated and a little prolapsed, there was a severe rash about the rectal area and the navel protruded severely. The blood counts showed hemoglobin 79 per cent, red blood cells 3,450,000 and white blood cells 25,000. Kline and Kahn reactions were negative and the urine was essentially normal. Other physical conditions also were not remarkable. Food was withheld for twenty-four hours, and 5 per cent dextrose (from 150 to 250 cc.) was given intraperitoneally and also 5 per cent dextrose in saline solution (from 100 to 150 cc.) three times a day. The admission weight was 8 pounds 4 ounces (3,742 Gm.). Gradually the baby was given S. M. A. and the amount of fluids administered parenterally reduced, so that in about six days the fever was gone, the rectal area became normal and the stools became formed, yellowish brown and smelled sour. On the seventh day in the hospital the baby had no fever, was taking from 3 to 4 ounces (90 to 120 cc.) of S. M. A. every four hours, looked bright and weighed 8 pounds 6 ounces (3,799 Gm.). She was also receiving orange juice (1 ounce) cod liver oil (two teaspoonfuls) and vitamin B. She was passing daily from eight to nine stools of a fairly normal appearing type. Her condition continued in just this manner until the eleventh day, at which time the baby was taken home. On the fifteenth day of her illness she was in practically the same state. Her weight was still 8 pounds 6 ounces. She still looked well, had no fever, took her S. M. A., orange juice, cod liver oil and the like and still passed stools as described from eight to nine times a day. A tuberculin test done at this time was also negative. The baby was put on a three instead of four hour schedule. Today, her twenty-sixth day of illness, she weighs 8 pounds 6 ounces, as before. Her condition to all intents is as before except that she passes only from six to seven stools daily. These are formed, are yellowish brown and have little odor. Neither the spleen nor the thymus or any other gland is palpable. Her general condition seems good but she does not gain weight. I have made a diagnosis of athrepsia. Is this correct? Can you suggest any other therapy?** **M.D., Ohio.**

ANSWER.—The description strongly suggests the possibility of an infectious or parenteral diarrhea which has progressed into a severe nutritional disturbance. The paradoxical reaction to food, stationary weight and frequent stools are all characteristic or athrepsia. A careful physical check-up and urinalysis should be done to rule out the possibility of any parenteral infection. Stools should be cultured to remove the remote possibility of specific bacillary dysentery. The most important phase of the treatment of this condition is prophylactic. Management of the acute stage of diarrhea should include early starvation and the use of milks low in carbohydrate and fat, such as Finkelstein's eiweiss milk or protein milk.

It must be remembered that the athreptic infant does not have the ability to assimilate food properly. The intestinal tract cannot digest and absorb food well. In addition there is a disturbance of mineral metabolism due to the loss of electrolytes in the stools. This leads to withdrawal of mineral from the tissues and plasma with ensuing disturbance of osmotic relationships. This in turn leads to a marked circulatory disturbance with concentration of the blood and decreased volume. A clear understanding of these principles indicates the course of treatment. This includes small feedings of easily assimilated milk mixtures, parenteral fluids and blood transfusions to restore circulatory volume and replenish the supply of electrolytes. A short period of starvation is advisable to begin with—about six hours. During this time small amounts of Ringer's solution, physiologic solution of sodium chloride or weak tea may be given. If the infant cannot take fluids well by mouth or if the tissue turgor is poor, a blood transfusion of about 50 cc. followed by a slow intravenous infusion of 5 per cent dextrose in saline solution should be started. For details of this technic see Brennemann's Practice of Pediatrics (Hagerstown, Md., W. F. Prior Company, Inc., 1936, volume I, chapter XV). If this is not feasible, hypodermoclysis of physiologic solution of sodium chloride should be given twice a day.

The feeding of choice in this condition is human breast milk and every possible effort should be made to obtain it. Small frequent feedings should be used at the start, from 1 to 1½ ounces every two hours. One can start with one half ounce for the first few feedings and increase by steps of one fourth ounce with each feeding. Ringer's solution, saline solution or weak tea can be offered between feedings. After forty-eight hours the amount may be increased to 2 ounces every three hours, and as the infant's food tolerance improves it can be raised so that by the end of one week from 3 to 4 ounces may be given every three hours. In the event that no breast milk is available, protein milk is the next choice. One should follow the same principle and give small frequent feedings, using the approximate ratio of one level tablespoonful of the powder to 2½ ounces of water. Carbohydrates should be added to make up 3 per cent. The following is a sample formula:

Powdered protein milk.....	6 level tablespoonfuls
Water	15 ounces
Carbohydrate in the form of one of the maltose-dextrin combinations	4 drachms

The child should be kept on the protein milk until there is a steady increase in weight. The carbohydrate can be increased to 5 per cent after a few days and the protein milk concentrated to one level tablespoonful to 2 ounces of water. Orange juice can be added during the second week and if not tolerated ascorbic acid can be given. Cod liver oil can be deferred until the infant is on a regular feeding. The breast milk or protein milk feeding should be continued until the infant shows a definite gain in weight and the tissue turgor approaches normal. At this point a gradual change should be made to a diluted whole milk or evaporated milk mixture. One can substitute one feeding a day until the feedings are all replaced. It is best to start with the more dilute mixtures, either 2 ounces of whole milk to 1 ounce of water or 1 ounce of evaporated milk to 2 ounces of water and not more than 3 per cent carbohydrates being used.

RAGWEED POLLEN ON MARTHA'S VINEYARD

To the Editor:—**Can you supply me with information on the pollen counts for Martha's Vineyard?** **Harold A. Abramson, M.D., New York.**

ANSWER.—No pollen counts are available for Martha's Vineyard, but, judging from the proximity of this island to Nantucket Island and Block Island and from the conditions prevailing in the latter, it would seem that Martha's Vineyard could not be recommended as a refuge for those sensitive to ragweed pollen. Ragweed pollen concentrations average heavier on Block Island and Nantucket Island than in Boston and New York City.

XANTHOSIS FROM EGGS

To the Editor:—**One of my patients, a white man aged 25 with nervous indigestion, consumes raw eggs regularly as a supplement to his daily diet. He watches his weight and when he notices a loss he uses larger quantities of eggs, sometimes consuming from eight to twelve daily. He recently asked me whether there would be any deleterious effects from this regimen. I recalled that several years ago a patient from a rural area was presented at a medical society meeting who showed a generalized yellow pigmentation from consuming large quantities of raw eggs (I do not recall the amount) over a long period of time. Under ordinary conditions would the regimen followed by my patient be likely to result in such pigmentation? Would from eight to twelve raw eggs a day whipped with milk be likely to result in a symptom of this type? What would be the first area of pigmentation that would act as a warning sign? How long would it take such pigmentation to disappear once it began?**

M.D., Louisiana.

ANSWER.—The yellow pigmentation described is probably the condition known as xanthosis, the result of xanthemia (carotenemia). Egg yolks contain large amounts of the xanthophyll pigment beta-carotin, and the consumption of from eight to twelve eggs a day would be sufficient to cause xanthosis in susceptible persons. No ill effects are attributable to this condition.

The regions first affected usually are the palms of the hands and the soles of the feet. The condition described in the patient referred to in the inquiry may disappear simply by limiting the egg yolks to not more than two a day, but it may also be necessary to restrict the intake of the green and yellow vegetables. If this is done, attention should be given to the adequacy of the intake of vitamin A, since beta-carotin is the provitamin from which vitamin A is manufactured in the body.

A satisfactory discussion of this subject is contained in the paper of Boeck and Yater (Xanthemia and Xanthosis [Carotenemia]: A Clinical Study, *J. Lab. & Clin. Med.* **14**:1129-1143 [Sept.] 1929).

LATE RESULTS OF HEAD INJURY

To the Editor:—**A man aged 21, while playing baseball in midsummer 1938, was struck on the right zygoma by a hit ball. He immediately experienced a warm sensation along the region of the sagittal suture back to the occipital region and transitory dizziness. Whereas he states that he had been normal in every respect up to that time, he has since been unable to concentrate, to carry a thought more than momentarily or to distinguish details when attempting to focus his eyes on objects from the size of a wrist watch to that of a basket ball. Attempts at simple mathematics which he had formerly mastered in high school result in utter failure. Watching passing vehicles gives him a sensation of falling in the direction opposite that of the vehicle's motion, of weakness in both knees and calf muscles, "light headedness," and nervousness which never subsides entirely. Bending over forward and then straightening to an erect posture gives the sensation of falling backward. His blood pressure is 120 systolic, 70 diastolic; the temperature, pulse and respiration rate are normal; urinalysis is negative microscopically and for albumin and sugar; the Wassermann reaction is negative; there has been no loss of weight. The patient appears somewhat apprehensive regarding his general condition but especially concerning his lack of power to concentrate. Responses are somewhat delayed as a result of his inability to command the correct words to express himself and the ready flight of most of his thoughts. There are no external evidences of injury to the head or face and no deformities. The external auditory canals were impacted with cerumen, but its removal failed to influence the condition or to reveal any gross abnormalities. Auditory and visual powers seem equal bilaterally. Rotation produces lateral nystagmus in the direction opposite rotation. There is a suggestion of a Romberg sign, but the patient is aware of his rocking motion, which is principally toward the right. The Babinski sign or its equivalent is absent. Can you suggest some further examinations that may aid in reaching a diagnosis of this condition? Amphetamine sulfate tablets daily in divided dosage for a week afforded relief of the "light headedness" only, but I am reluctant to use such a drug over a prolonged period. Can you suggest therapy that might afford relief for this patient? Do you think there has been any damage to the cerebellum or to the vestibular division of the eighth nerve?**

Louis C. Stokes, M.D., Coatsville, Pa.

ANSWER.—The problem is whether one is dealing only with a post-traumatic neurosis or if there also has been some actual brain damage. It is assumed that x-ray examination of the head failed to reveal any bone injury. If he has any actual and constant difficulty in finding words and particularly if he often uses wrong words, one would suspect that there has been some injury to the part of the brain that controls speech. If he is right handed, it would have to be a contracoup injury, since he was struck on the right side of the head. The difficulty in concentration and other subjective sensations are well explained by a traumatic neurosis. If there is any claim for insurance or other compensation in connection with the injury, the supposition that one is dealing mainly with a neurosis would be strengthened.

NERVOUS EFFECTS OF ELECTRIC SHOCK

To the Editor:—**What are the probable effects on the sensory nerves and muscles of the arm and hand following a rather severe shock from alternating electric current? The shock was not severe enough to produce a burn but was sufficient to prevent the person from releasing his grasp on the iron bar that conducted the electricity.**

C. B. Thomas, M.D., Norwalk, Ohio.

ANSWER.—Alternating current is about three times as dangerous as direct current. If a good contact is made there may be little external evidence at the site of contact, yet fatal results have occurred. When the person is not able to release his grasp, the muscles are in tetany. This may cause injury to the fibers (hemorrhages and fragmentation of fibers). The peripheral blood vessels may be in spasm, and effects of ischemia may become evident. The peripheral nerves may even become degenerated. After severe shocks, cases of disseminated sclerosis and amyotrophic sclerosis have been reported. In any of the complications, objective evidence will be present on examination of the affected part; i. e., anesthesia, atrophy and reaction of degeneration to electrical testing. In peripheral damage per se the prognosis for recovery is usually good.

Reference:

Elkins, E. C.: *M. Clin. North America* **22**: 1009 (July) 1938.

ANESTHETIC EXPLOSIONS

To the Editor:—**Could you give me any information on the relative dangers from explosions of nitrous oxide with ether, ethylene and cyclopropane? I would be interested to know the number of fatal explosions from the use of any of these agents during the last year.**

R. K. Finley, M.D., Dayton, Ohio.

ANSWER.—There is a real danger from explosions of nitrous oxide when used with oxygen and ether and with ethylene and cyclopropane. A number of explosions which have occurred are listed in the report of the Subcommittee on Fires and Explosions of the American Society of Anesthetists, Inc. (excerpt from the report of the Subcommittee on Fires and Explosions, News Letter of American Society of Anesthetists, Inc. **2**:3 [April] 1939). Additional information on explosions can be found in the proceedings of the regular meeting of the American Society of Anesthetists, Oct. 20, 1938. However, in all probability this does not represent all the explosions that have taken place. Since it is necessary to use the gas machine in the administration of these anesthetics, precaution must be taken to eliminate the danger of static electricity and also to eliminate the danger of using the cautery or diathermy in close proximity to these agents.

A study of the possibilities of eliminating some of these hazards is being made at the Massachusetts Institute of Technology by Professor Horton.

FACE MASKS FOR LUPUS

To the Editor:—**I have recently come across a severe case of lupus erythematosus which is quite refractory to treatment, and I am wondering whether you have any authentic information on recent advances in artificial face masks or plastics. It seems that this patient has used masks which were obtained some ten months ago but which are not at all satisfactory.**

J. E. Kaiser, M.D., San Diego, Calif.

ANSWER.—A great many of these masks were used by the French during the war; the Americans have used few of them.

Reconstruction of as much as half the face or more by flaps taken from other parts of the body has been quite satisfactory in the hands of those accustomed to handling this work. It was done in the army for service connected injuries; it is being done now after extensive treatment for cancer, wide cautery destruction for lupus and extensive injuries of other types.

The most satisfactory artificial restorations are being made from a new type of self-vulcanizing rubber latex in which color is introduced into the substance of the rubber. These are glued in place; they are hardly practicable on the cheek or openings into the mouth. This idea was first suggested by A. Pont of the French army, who made them out a gelatin mixture, the soldier heating the gelatin each day, pouring it into the mold and peeling it out.

RATTLESNAKE VENOM

To the Editor:—**What are the commercial markets for live rattlesnakes or for the venom?**

Rollin M. Falk, M.D., Fall River Mills, Calif.

ANSWER.—About twenty years ago rattlesnake venom was employed in the treatment of epilepsy with more or less success, and quite an extensive literature has been published on this subject. More recent scientific work concerning it has revealed that, irrespective of the possible therapeutic use of rattlesnake or Crotalus venom, it is unstable, decomposing rapidly at room temperature, and that furthermore it is almost impossible to prepare a sterile solution of this drug. For this reason rattlesnake venom is no longer employed by rational pharmacotherapeutists and is not to be obtained on the market. In addition, it is interesting to note that the toxicity of venom from different species of rattlesnake varies enormously (Macht, D. I.: *Proc. Soc. Exper. Biol. & Med.* **36**:499 [May] 1937).

EQUINE ENCEPHALOMYELITIS AND VACCINATION

To the Editor:—**I have noticed recently that investigators at the University of California have developed a vaccine against encephalomyelitis in horses. Also there seems to be some evidence of a transmissibility of this disease to man. Have you any information regarding the use of the vaccine in acute or chronic encephalitis in man?**

M.D., Florida.

ANSWER.—An effective vaccine consisting of ground infected chick embryo tissue treated with solution of formaldehyde was developed by Beard, Finkelstein, Sealy and Wyckoff (*Science* **87**:490 [May 27] 1938). This product has been shown to be highly effective as a prophylactic vaccine in experimental animals and in an extensive use of the material in horses and mules in the field. This product is only a preventive vaccine. It has no therapeutic value.

It has been conclusively shown that man may be infected with the virus of equine encephalomyelitis. It is possible to prepare a vaccine for use as a prophylactic agent in man, although the low incidence of this disease in human beings at the present time would not justify large scale vaccination. Such a vaccine would be of no use in acute or chronic encephalitis. It is only of preventive value. Moreover, the term encephalitis applies to a large group of etiologic conditions. Specific therapy, if such were available, would depend on an exact etiologic diagnosis in each instance.

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

Examinations of state and territorial boards were published in THE JOURNAL, September 2, page 966.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Medical centers having five or more candidates desiring to take the examination, Sept. 11-13. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th Street, Philadelphia.

SPECIAL BOARDS

AMERICAN BOARD OF ANESTHESIOLOGY: An Affiliate of the American Board of Surgery. *Oral.* Part II. Philadelphia, Oct. 14-15. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOGY: *Oral.* Philadelphia, Nov. 3-4. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Various sections of the United States, Feb. 19. Formal application must be received on or before Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written examination and review of case histories (Part I) for Group B candidates* will be held in various cities of the United States and Canada, Jan. 6. *Applications for admission to Group B, Part I, examinations must be on file not later than Oct. 4. General oral and pathological examinations (Part II) for all candidates (Groups A and B)* will be conducted in Atlantic City, N. J., June 8-11. *Applications for admission to Group A, Part II examinations must be on file not later than March 15.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: Written. Various cities of the United States and Canada, March 9. Oral. New York, June 10. *Formal applications must be received before Jan. 1.* Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Boston, January. *Applications must be filed on or before Nov. 1.* Sec., Dr. Fremont A. Chandler, 6 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: Chicago, Oct. 6-7. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PATHOLOGY: Memphis, Nov. 22-23. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit.

AMERICAN BOARD OF PEDIATRICS: New York, April 30 and May 1. Kansas City, Mo., preceding the Region III meeting of the American Academy of Pediatrics. Seattle, preceding the Region IV meeting of the American Academy of Pediatrics. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, December. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Atlanta, Ga., Dec. 9-11. Sec., Dr. Byrl R. Kirklin, 102-110 Second Avenue S.W., Rochester, Minnesota.

AMERICAN BOARD OF UROLOGY: Chicago, Feb. 9-11. (The only examination session to be held in 1940.) *Case reports must be submitted not later than November 9.* Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

District of Columbia July Report

Dr. George C. Ruhland, secretary, Commission on Licensure, reports the written examination held in Washington, July 10-11, 1939. The examination covered nine subjects and included sixty questions. An average of 75 per cent was required to pass. Twenty-three candidates were examined, all of whom passed. Four physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
George Washington University School of Medicine		(1936)	79.6, 83.6, 83.6, (1937) 79.6, 80.1, (1938) 79.8, 84.6, 89.5
Georgetown University School of Medicine		(1934)	79.6, (1936) 85.8, (1937) 84.1, (1938) 82.9, 83
Howard University College of Medicine		(1938)	82.5, 87.2
Northwestern University Medical School		(1934)	81
University of Illinois College of Medicine		(1935)	83.4
Indiana University School of Medicine		(1938)	87.6
Washington University School of Medicine		(1934)	78
Columbia Univ. College of Physicians and Surgeons		(1927)	78.2
Jefferson Medical College of Philadelphia		(1938)	86.6
Temple University School of Medicine		(1933)	79
University of Virginia Department of Medicine		(1933)	78.5

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1928)	N. B. M. Ex.
George Washington University School of Medicine		(1937)	N. B. M. Ex.
Duke University School of Medicine		(1934)	N. B. M. Ex.
University of Pennsylvania School of Medicine		(1926)	N. B. M. Ex.

Eight physicians were licensed by reciprocity from June 12 through July 26. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Georgetown University School of Medicine		(1934)	Maine
Howard University College of Medicine		(1934), (1935)	Tennessee
Emory University School of Medicine		(1936)	Georgia
Northwestern University Medical School		(1903)	Iowa
University of Maryland School of Medicine and College of Physicians and Surgeons		(1937)	Maryland
Western Reserve University School of Medicine		(1935)	Ohio
Univ. of St. Andrews Conjoint Med. School, Scotland		(1933)	New York

Book Notices

Textbook of General Surgery. By Warren H. Cole, M.D., F.A.C.S., Professor of Surgery, University of Illinois College of Medicine, Chicago, and Robert Elman, M.D., Associate Professor of Surgery, Washington University School of Medicine, St. Louis. Second edition. Cloth. Price, $8. Pp. 1,031, with 559 illustrations. New York & London: D. Appleton-Century Company Incorporated, 1939.

This is another textbook of general surgery designed primarily for the medical student. The material is made up, as is obvious from the text and as is stated in the preface, from lectures in general surgery and the specialties. The authors have succeeded in retaining the fundamental clarity and simplicity necessary for proper teaching. Brevity has been achieved by the omission of technical details and descriptions of operations. As Evarts Graham states in the foreword, it is futile to attempt to make an undergraduate an accomplished surgeon. The book begins with chapters on inflammation and repair and then presents the subjects of sepsis and antisepsis, infections, wounds and surgical methods used in treatment. The chapter on infections and injuries of the hands is brief but clear for such a difficult subject, which is basic not only for surgeons but for all general practitioners. The chapter on fractures, sprains and dislocations is good, as is the one on treatment of the diseases of the alimentary tract. The whole subject of abdominal surgery receives sufficient attention for a book of this size. Much emphasis is placed on diagnosis, pathology and symptomatology and necessarily less on the mechanical surgical intervention. The subject of general anesthesia deserves a more technical detailed discussion than is given. A large number of well chosen illustrations, usually conveying a definite meaning, are included. The reproduction of a photograph of a person who illustrates certain features of pituitary dysfunction and who recently figured in a legal controversy over the scientific reporting of his ailment not only adds zest to the chapter on endocrinology but indicates that this chapter is aptly down to date. This volume will serve best as an adjunct to classroom teaching, but its presentation and simplicity and the excellent bibliography will serve the general practitioner as well. It is somewhat regrettable that the fascinating history of surgery does not receive more space in a book intended for teaching, although some history is of course included. On the whole, as a general and extremely matter of fact textbook on surgery, this is a satisfactory one volume work.

Vaccination contre la sénescence précoce. Par C. Picado. Préface du Professeur Caullery. Paper. Pp. 240, with 44 illustrations. Paris: Librairie E. Le François, 1937.

The author discusses the interesting problems of biology, genetics, comparative anatomy and the latest conclusions as to the therapeutic value of vitamins and hormones. He looks on senility as a disease, which he designates as senescence. Senescence, in his opinion, predisposes to other disturbances and diseases, functional and infectious in nature. A thorough understanding of the functions of the ductless glands will perhaps lead to prevention of premature decline of the organism. He shows that longevity is not related to individual height, that height is only an evidence of continued growth and that duration of life does not depend on duration of growth. Man, among mammals, has the greatest longevity, at times passing the century mark. The book is divided into four parts. In part I is discussed "our liberation from vegetative perennialness," in part II "senescence and the causes which provoke it" (the experiments of Metchnikoff on butterflies and other researches are cited). Part III considers "our invisible metamorphoses," including the relationship of age and chemistry and correlated hormonic cycles; the relation of age and the chemical composition of the blood as determined by Carrel and others is mentioned. Part IV discusses the blood serum as a heterologic antigen. Part V takes up "active immunization against premature old age." Experiments on insects and animals are described. It is proposed to create "antibodies of old age" by vaccinating young animals with the blood serum of aging animals. "It is easy to conceive that the serum of old animals, constituted of more concentrated albuminoids, with different lipoids than those of a young animal, with proteolytic, saccharic and lipolytic

ferments which correspond to the hormonic cycle that the animal traverses in life . . . would be a veritable heterologic antigen in relation to the chemical constitution of the blood of a young animal of the same species." This is not rejuvenation of the aged but immunization of the young and a form of preventive therapy against old age. The book contains interesting chapters on dwarfism and gigantism and the development of secondary sex characteristics by the transplanation of organs. Hypothyroidism and hyperthyroidism and the influence of the hypophysis on gigantism and infantilism are considered. The transplantation of organs is well discussed. The book will be found interesting reading to those who desire to be abreast of the latest teachings of the value of ductless gland therapy.

Recent Advances in Chemotherapy. By G. M. Findlay, C.B.E., M.D., D.Sc. With a foreword by C. M. Wenyon, C.M.G., C.B.E., M.B., Director-in-Chief of the Wellcome Bureau of Scientific Research, London. Second edition. Cloth. Price, $5. Pp. 523. Philadelphia: P. Blakiston's Son & Co., Inc., 1939.

The first edition of this book appeared eight years ago, prior to the discovery of chemotherapeutic agents which were effective in the treatment of acute bacterial infections. Therefore it necessarily was for the most part devoted to a study of the action of chemical agents on helminthic, protozoal and spirochetal infections. The new edition covers a wider field, and more especially by virtue of a rather loose interpretation of the definition of chemotherapy. It represents a fairly successful attempt to present concisely as much as possible of the recent advances made in chemotherapy in its broader sense. In this respect the book is commendable. From the standpoint of the general practitioner, much of the material is either of little interest or of limited practical application. This is particularly true of much of the extensive discussion of pharmacodynamics, which is included at the expense of omitting the details of methods of therapeutic application. The author, however, presents the various drugs considered in an orderly manner on the basis of their historical and chemical development. The latter method of developing the discussion for each new drug somewhat lessens the chemical knowledge required to follow the significance of the selection of one preparation in preference to its related predecessor. In this respect the book should prove of especial interest and information to the medical profession. The author has preserved a commendable style of presentation and has exercised critical judgment in his summary statements. The reader must remember that the use of many of the chemicals suggested for trial in the treatment of various diseases should be postponed until sufficient clinical evidence is available by which to judge their merit.

Surgical Anatomy. By C. Latimer Callander, A.B., M.D., F.A.C.S., Associate Clinical Professor of Surgery and Topographic Anatomy, University of California Medical School, San Francisco. With a foreword by Dean Lewis, M.D., Sc.D., LL.D. Second edition. Cloth. Price, $10. Pp. 858, with 819 illustrations. Philadelphia & London: W. B. Saunders Company, 1939.

In the foreword Dean Lewis declares that gross anatomy is now a sterile field for research but that the importance of gross anatomy to the clinic has not changed. To the surgeon gross anatomy is of paramount and permanent importance. Constant advances in surgical technic necessitate revision in anatomic textbooks designed for surgeons. The need for such works is demonstrated by the widespread popularity which this textbook has gained in its comparatively brief existence. Standard traditional treatises on gross anatomy do not change much from edition to edition. However, surgery, which is the clinical approach to anatomy, constantly demands reorientation and reemphasis of previously established concepts. In fulfilling this aim, this volume comes close to the mark. A considerable amount of contemporary material has been incorporated, as is at once evidenced by the recent dates on many of the illustrations. It is pleasing that, although new additions are numerous, the volume has not been increased in size. Subjects which have been the foci of attention in the past few years are reemphasized, such as lumbar sympathectomy for hypertension, diaphragmatic hernia and operations for the relief of chronic backache associated with disease of the intervertebral disks or the ligamentum flavum. The arrangement of the book is on a topographic basis. The descriptions begin with the scalp and cranium and continue in descending order to the foot. Each section is complete unto itself as far as nerves, vessels and relationship to adjoining structures are concerned. No fault can be found with the anatomic detail or its method of presentation. The illustrations are clear and practical, and few fail to be excellent. The weaker portions of the book and the sections which invite the most criticism are the clinical aspects, such as the selection of optimal technic and indications. It is surprising that no mention of transurethral prostatectomy is made although both the suprapubic and perineal methods are described. The omission of simple drawings to illustrate the various types of gastric operations, usually known under the names of their innovators, will confuse the tyro. A diagram of the circle of Willis, which is always a tax on the student's memory, could also be included with profit. This forms a good reference book for the complex detail required by the surgeon in order to understand in practical fashion the task before him. The direct linkage of the anatomic structure with the clinical approach adds zest to an otherwise dry subject. Many of the illustrations combine surgical technic with clear anatomic portrayal advantageously. There is no reason why this book should not continue to serve the student and practitioner of surgery.

Minor Medical Operations for Senior Medical Students and Recently Qualified Practitioners. By Kenneth Harris, M.A., M.D., F.R.C.P., Physician, University College Hospital, London, and Edith Harris, M.B., B.S., D.P.H. Cloth. Price, 7s. 6d. Pp. 198, with 41 illustrations. London: H. K. Lewis & Co., Ltd., 1938.

This little manual is designed for the practitioner who may be distant from help and is called on to perform minor procedures unaided. The young physician is apt to forget the practical points he has been taught in medical school when he is brought face to face with the problem of tapping the pleural cavity or giving an intravenous injection. The authors place proper emphasis on the minutiae. They describe pleural shock; they explain the sensitivity of iodides and cocaine when injections of iodized oil are considered; they warn the doctor himself to beware of infection when he examines throats. They are practical enough to know that the suitable vein in the antecubital fossa is the palpable one and not the tiny visible one which seems tempting but betrays the operator by collapsing when suction is applied. Their precautions in nursing care with regard to quiet and order bespeaks a thoughtful personal experience. In general the procedures are the same the world over, but there are some specific situations which apply particularly to the British scene such as notes with regard to chimney openings and registers which are not so conspicuous in the United States. A correction should be noted with regard to the scarlet fever blanching test, which requires the use of scarlet fever antitoxin and not the toxin which they state on page 156. A valuable addition to the section on intravenous fluids is suggested in the following. Throughout the larger children's hospitals in the United States this procedure has been greatly simplified by the use of the small veins of the ankle, elbow and even fingers and scalp. The arm or leg is fastened to a padded board by broad bands of adhesive tape. An incision is made across the course of the vein which permits the vein to be picked up and a cannula inserted and fastened. Transfusion of blood or other fluids is carried out with the usual gravity apparatus. The cannula may be left in situ for several hours for repeated use if desired. On the whole the book will find its greatest usefulness to senior medical students and the practitioner largely dependent on his own resources who has had little experience with methods which should have been acquired in a well rounded internship or apprenticeship.

Classified and Annotated Bibliography of Sir William Osler's Publications (Based on the Chronological Bibliography by Minnie Wright Blogg). Edited by Maude E. Abbott, B.A., M.D., LL.D. Second edition. Cloth. Price, $2.25. Pp. 163, with 2 illustrations. Montreal, Canada: The Medical Museum, McGill University, 1939.

None of Osler's friends could be surprised at the enduring interest in his writings, though even the most intimate have always been astonished by their quantity and variety. On his seventieth birthday Osler himself wrote of Miss Blogg's original compilation, 1919, it "brought the thrill of the day when I saw revealed the utter shamelessness of my life, a bibliography of my writings extending to 740 articles." What would he say of the present work, which records more than 1,500 separate items to the credit of what he called his "ink-pot career"?

A revision of the classified bibliography in Dr. Abbott's "Osler Memorial Volume," 1926, of the International Association of Medical Museums, this edition supplies a complete index to the titles of his publications. They are arranged in seven classes: natural science, pathology (comparative and human), clinical medicine, literature (history, biography), education and medical profession, public welfare and volumes edited. In each class the arrangement is chronological. The supplementary addenda include the indiscretions of Osler's impish pseudonym, "E. Y. Davis." A useful and revealing volume, well produced.

The Student's Handbook of Surgical Operations. By Sir Frederick Treves, Bart., G.C.V.O., C.B. Revised by Cecil P. G. Wakeley, D.Sc., F.R.C.S., F.R.S.E., Senior Surgeon to King's College Hospital, London. Sixth edition. Fabrikoid. Price, $5. Pp. 563, with 246 illustrations. New York: Paul B. Hœber, Inc., 1939.

The popularity of this practical little manual on surgical procedure has probably diminished somewhat since its inception, because of the vast growth of surgery and the number of larger treatises which have appeared on the subject. It is hardly possible to revise a book of this type to bring it completely down to date. Only a few examples are necessary. It is now many years since the Billroth-Mikulicz operation for partial gastric resection was considered the method of choice, yet this method is the focus of description. Mention is not made of the various Polya types of gastric resection which are now widely used or of the use of living fascial suture in the repair of hernia. Such shortcomings, however, are chiefly in the field of major surgery, which students are not expected to know thoroughly. This book is of course written for the English student and as such is expected to be different from that used by the American. Some of the clearest and most practical descriptions available are in this little volume. The technic of tracheotomy, with all the pitfalls that may beset the operator, is presented clearly and concisely. For a brief presentation of surgical technic, indications for operation and choice of method this small volume accomplishes all that can be expected.

Endocrinology in Modern Practice. By William Wolf, M.D., M.S., Ph.D., Endocrinologist to the French Hospital, New York. Second edition. Cloth. Price, $10. Pp. 1,077, with 176 illustrations. Philadelphia & London: W. B. Saunders Company, 1939.

In this edition Wolf has included a considerable amount of data which has become available since the publication of the original volume. There has been, in addition, a revision of many of the sections in accordance with the more recent progress in endocrinology. Wolf has made a sincere attempt to furnish the physician with a book on clinical endocrinology which contains a wealth of information in an assimilable form. The book is constructed for the convenience of the reader and includes for this purpose many practical features. The clinical descriptions are systematic and adequate, and at the end of each chapter there is a table which summarizes the contents of the chapter. In addition to discussions of the endocrine diseases there are numerous chapters on the relation of bodily disorders to glandular function, such as surgical and orthopedic diseases, nervous and mental diseases, and diseases of the liver, kidney and cardiovascular systems. The section on endocrine diagnosis is an excellent one and contains data which are ordinarily difficult for the physician to procure, such as height and weight tables, interpretation of laboratory observations, bone age readings, bio-assays and tests for endocrinopathies. At the end of the book there is a table of symptom diagnosis which is quite complete. It is unfortunate that the quality of the book is somewhat marred by the inclusion of a certain amount of unscientific material. The author's discussions are also sometimes uncritical on certain phases of glandular disturbances, especially etiology and physiology, in which he admits concepts which active investigators have abandoned or disregarded. The paragraphs on treatment are at times unreliable, since they may include obsolete methods. Wolf persists in retaining the antiquated armamentarium of "desiccated gland" preparations which modern endocrinology has definitely rejected. The elimination of such material and a keener evaluation of the recent endocrine literature would materially enhance the value of the book as an aid to the physician in his understanding and treatment of glandular diseases.

The Nineteen Thirty Eight Mental Measurements Yearbook of the School of Education, Rutgers University. Oscar Krisen Buros, Editor. Cloth. Price, $3. Pp. 415. New Brunswick: Rutgers University Press, 1938.

The School of Education of Rutgers University has made a survey in the past of the literature on tests and testing. The need for a yearbook in this field has been quite apparent for some time past and the present volume is an attempt to survey the field for 1938. Tests of educational achievement, capacity and intelligence, research and statistical methodology and recent testing programs which came out during that year are all listed in the present volume. Nothing but editing is contributed by the School of Education, for the comments on the included material are culled from the regular review of the tests in the current scientific literature. It is a valuable source book for those who are doing mental testing.

Surface Anatomy. By W. E. Roberts, M.R.C.S., L.R.C.P., Hon. Demonstrator of Anatomy, University of Sydney. Foreword by A. N. Burkitt, M.B., B.Sc., Professor of Anatomy, University of Sydney. Cloth. Price, 7s. 6d. Pp. 93, with 40 illustrations. Sydney, Australia: Angus & Robertson Limited, 1937.

This is a brief book on topographic anatomy, with especial attention to surface markings. The illustrations are reproductions of photographs and as such are supposed to offer the natural body contours. Some of them are mediocre and no better than line drawings. The intent of the book is excellent, but more and better illustrations are needed. In a book obviously intended for medical students, omission of pelvic illustrations is a serious fault which sharply curtails its value as an anatomic reference.

Klinische Endokrinologie: Ein Lehrbuch für Ärzte und Studierende. Von Arthur Jores, Dr. med. habil. Paper. Price, 27 marks. Pp. 356, with 91 illustrations. Berlin: Julius Springer, 1939.

Because of the tremendous amount of data published in recent years on endocrinology, it is most difficult to obtain a thorough knowledge of the scientific developments in this field unless one has participated actively in experimental investigation. Dr. Jores has been active in experimentation on the various phases of glandular physiology and the application of this work to the clinic. His evaluation of the clinical aspects of glandular diseases is therefore based on a sound foundation of scientific principles. His textbook is constructed on the concepts developed recently in the laboratory and inherits little of the obsolete material which has been handed down in a routine manner for many years in textbooks on clinical endocrinology. The subjects are discussed systematically, concisely and thoroughly. Under the heading of each gland there is discussed in adequate detail the anatomy, physiology, pathology and clinical manifestations of the various glandular disorders and their treatment. At the end of each chapter there is a special summary on therapy, with the preparations of that particular gland. The author's judgment is sound. There are excellent illustrations and reproductions of photographs throughout the book and useful tables of the modern commercial endocrine products. It is noted with gratification that the antiquated "desiccated gland" armamentarium, which has been retained in many textbooks even in recent years, is omitted. The bibliography is extensive and is nicely classified for reference work.

202 Common Household Pests of North America. By Dr. Hugo Hartnack. Fabrikoid. Price, $3.75. Pp. 319, with illustrations. Chicago, Illinois: Hartnack Publishing Company, 1939.

This is a compilation of information published in various languages, particularly German, concerning household pests, the total number of pests discussed in the book being 202. Heretofore there has been no one book in which somewhat detailed information concerning such a large group of household pests could be found. There is a need for readily available information in order that the problem presented by these pests may be better understood and more effective methods of control possibly may be found. The author first directs attention to rats and mice, pointing out their habits, the damage they do to property and to public health and suggesting various individual and community methods of control. Other pests discussed are birds, pigeons, roaches, crickets, earwigs, beetles, ants, moths, flies, mosquitoes, bedbugs, ticks and spiders. The damage done by

these pests is generally emphasized. The problem is one of major hygienic and economic importance. Their menace is present in the office, factory, store or home, and even when one lies down to sleep. The author believes that too much is expected of chemical exterminators. He is cognizant of the information which the government has made available to the public but feels that there remains some indifference on the part of the government in the matter of control. He knows of no better way to solve the problem than to apply and practice the rule of L. O. Howard, which he prints above Dr. Howard's signature opposite the title page and which he analyzes in the closing pages. Howard's rule is as follows: "When the economic entomologist confronts an emergency problem, it is his duty to bring measurable relief as speedily as possible. At the same time he must begin studies looking forward to natural and therefore comparatively costless control."

Penny Marsh, Public Health Nurse. By Dorothy Deming, R.N. Cloth. Price, $2. Pp. 266, with illustrations by Dorothea Warren. New York: Dodd, Mead & Company, 1938.

A well written and interesting story of a graduate nurse who decides on a public health nursing career. The reader follows Penelope Marsh from private duty nursing, through a period of work with the Visiting Nurse Association, to the special course of study in the graduate school of a university. While the book is a novel relating the experiences and adventures of one nurse, it makes an eloquent plea for the public health branch of nursing service. The book will be especially enjoyed by the nurse in training as well as the young women in college and senior high school who are planning a nursing career. The physician will find this a splendid volume to recommend to his families whose daughters have expressed a desire for information about nursing.

Sbornik trudov posvyashchenny LV-letiyu nauchnoy i uchebnoy deyatelnosti zasluzhennogo deyatelya nauki professora G. I. Turnera. [Collection of Works Celebrating 55 Years of Scientific and Pedagogic Activity of G. I. Turner.] Cloth. Price, 13 rubles 50 kopecks. Pp. 419, with illustrations. Leningrad: Izdanie Voenno-Meditsinskoy Akademii R. K. K. A. im S. M. Kirova, 1938.

This small volume is dedicated to 80 year old G. I. Turner, the founder of the chair of orthopedics in the academy. The contributions are by the members of the academy and deal with orthopedics.

The International Cancer Research Foundation. Report of Activities During 1938. Paper. Pp. 157. Philadelphia, [n. d.]

This volume is an annual publication which summarizes the investigations of this organization during the current year. It is primarily of interest to those who are concerned with cancer research. The progress of each investigation is described and the original articles arising from such work are carefully tabulated. The organization paid grants of more than half a million dollars during 1938, and between 35 and 50 per cent of the funds were allotted outside the United States in accordance with its by-laws. The funds are used for experimentation and not for building or equipment, although the foundation can accept gifts or contributions for the latter items. The organization was founded in Philadelphia June 8, 1932, and since that time has been responsible for much investigation into the causes, prevention, control, relief and cure of "those diseases . . . commonly called cancer."

You and Heredity. By Amram Scheinfeld. Assisted in the Genetic Sections by Dr. Morton D. Schweitzer, Research Geneticist, Cornell University Medical College, New York. Cloth. Price, $3.75. Pp. 434, with 75 illustrations, including 4 color-plates. New York: Frederick A. Stokes Company, 1939.

The author of this book writes on heredity, as he puts it, "from the outside looking in"; that is, from the point of view of a layman peering into the laboratories of the scientists. He has, however, carefully guarded his accuracy by free consultation with numerous scientific authorities, and the result is an easily readable yet accurate discussion of the present knowledge of human heredity. The two chapters on the inheritance of musical talent, which constitute an original genetic study, are most interesting and clearly demonstrate the failure of many human qualities to manifest readily identifiable hereditary characteristics. It is pleasing to find some commonly credited misbeliefs accurately handled, such as the idea that the entire hair can turn suddenly white. In listing the twelve diseases which take the largest toll of life in the United States yearly, the year from which the figures are taken should be stated, since their order changes from time to time as is well known. In speaking of the inheritance of cancer, some reference might also be made to the work of Maud Slye, even though her work relates to the inheritance of cancer in mice rather than to human cancer. The book contains the answer to numerous questions propounded to doctors, such as the advisability of cousin marriages. It may be enthusiastically recommended to the public and to physicians alike.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Supposed Injury to Recurrent Laryngeal Nerves Attributed to Tonsillectomy.—On Aug. 28, 1930, Dr. Davidson, one of the defendants, removed the tonsils of Sylvia Daniels, then 13 years old. Three years later her father, her mother and a guardian of the child appointed for the purposes of the suit sued the clinic at which the operation had been performed and certain physicians who had taken part in it for alleged malpractice.

The plaintiffs alleged that in performing the tonsillectomy the defendants were careless and unskilful and so cut the vocal cords and nerves that control the vocal cords or the organs that control the voice, or infected them or caused them to be infected, in such a manner as to cause the permanent loss of the child's voice. They complained, too, that the operation was performed when the patient was known by the defendants to be suffering from an infection of her throat, commonly known as a cold. The case was not tried until January 1935, more than four years after the operation. The jury returned a verdict in favor of the plaintiffs, but on June 5, 1936, on motion of the defendants, a judgment was entered in their favor notwithstanding the verdict. The plaintiffs thereupon appealed to the Supreme Court of Washington.

A trial court, said the Supreme Court, is not warranted in entering a judgment notwithstanding the verdict of the jury if there is evidence, or reasonable inference from evidence, to sustain that verdict. If the evidence is conflicting, and reasonable men may differ with respect to it, then only the jury can decide. In passing on a motion for a judgment notwithstanding a verdict, the court must assume the truth of all evidence in favor of the party in whose favor the verdict was rendered and must draw from it all reasonable inferences favorable to him.

In the present case, the patient's mother testified that her daughter had a cold but that Dr. Davidson refused to operate and did not operate until after the patient had recovered from it. Two of Dr. Davidson's office assistants testified that when the patient came for the operation her voice was merely husky, as if she had a cold. Dr. Davidson himself testified that when the patient came to him for the operation her voice was husky, and his records showed that it continued so, although it improved, after the operation. Various witnesses testified that previous to the operation the patient had "a beautiful, fine, normal singing voice, and after the operation she was never known to sing or speak above a whisper." On the issue of the loss of voice, therefore, the jury, said the Supreme Court, was warranted in finding for the plaintiff.

Anticipating that the defendants would contend that the patient's whispering voice was due to a growth on the vocal cords, the plaintiffs introduced early in the trial one Dr. Thomas Ratigan, who, although a general practitioner, had removed as many "as thirty pairs of tonsils in a morning." Dr. Ratigan testified that he had examined the patient's throat and found no growth. The patient, who had been treated by no less than twelve surgeons and laryngologists since the operation, however, testified on cross-examination that they told her that there was a growth. On motion of the defendants, the court appointed two specialists to examine the throat. They agreed that there

was a small growth on each of the patient's vocal cords that prevented the cords from coming together. These growths, one of the court-appointed experts testified, were the cause of the patient's whispering voice. Nevertheless, said the court, although it seems incredible that these expert witnesses would testify that there were growths on the vocal cords if there were none, the jury had the sole right to weigh their testimony against that of Dr. Ratigan and the jury evidently believed Dr. Ratigan.

Although the original complaint had charged that the vocal cords or the nerves that control the vocal cords had been cut, it was subsequently amended insofar as it undertook to describe the manner in which the cords or nerves were severed. As a matter of fact, all expert witnesses who testified, including Dr. Ratigan who testified for the plaintiff, declared that it was impossible in a tonsil operation to cut the vocal cords or the nerves that control them. A tonsil snare such as is used in a tonsil operation could not be made to pass the epiglottis and enter the larynx or cavity in which the cords were located. One expert, however, qualified his statement by testifying that the nerves controlling the vocal cords could not be cut unless the patient was anatomically abnormal, but there was no claim that the patient in this case was abnormal.

The plaintiffs' expert, Ratigan, testified that in his opinion the whispering voice of the patient was the result of the operating physician's pulling so hard on the tonsil "as to separate the nerve from the muscles which control the voice." As tending to prove that the operation was performed in a rough manner, the plaintiffs introduced evidence to show that the patient had a hemorrhage two or three days after the operation, another one several days later and a third on the eleventh day, and Dr. Ratigan testified that three hemorrhages occurring in a period of seven or eight days after an operation were so unusual as to indicate that there had been a rough pulling or stretching. Ratigan admitted that he had never seen a tonsillectomy result in a permanent whispering voice and he did not know of any instance recorded in the medical literature in which it had done so, but he had heard of such a case. The physician who operated and three other experts called to testify on his behalf had never heard of a tonsillectomy causing a permanent loss of voice nor had they ever seen a report of any such a case in the medical literature. In their judgment it was impossible to rupture a recurrent laryngeal nerve which controls the vocal cords by pulling on a tonsil.

The vital and decisive issue in this case, however, said the court, was not whether the nerve *could* be separated from the muscles by pulling on the tonsil but whether it actually had been separated in any manner. There was no evidence whatever in the record that the recurrent laryngeal nerves, which control the vocal cords, were actually separated from the muscles of the larynx or were injured in any way. On the other hand, there was indisputable evidence that they were functioning on the day of the trial. Dr. Ratigan himself admitted that if the nerve was separated from the muscles it would leave them paralyzed. The two medical experts summoned by the court stated that on their examination the cords moved both on breathing and on an attempt to speak. This showed that the cords were not paralyzed and were functioning properly. Dr. Ratigan admitted that the only circumstance that indicated that the tonsils had been pulled sufficiently to tear the laryngeal nerves from the muscles of the larynx was the loss of voice, which he could not explain in any other way.

There was a complete lack of evidence, said the Supreme Court, that the nerves controlling the vocal cords had been severed. On the other hand, there was indisputable proof that that could not have been the case. The trial judge was warranted, therefore, in the opinion of the Supreme Court, in finding that there was not a scintilla of evidence to show that the recurrent laryngeal nerve was severed from the muscles controlling the voice. Dr. Ratigan's testimony to the effect that solely because the patient had lost her voice he believed the nerves had been severed from the muscles they controlled was not sufficient evidence on which to predicate a judgment against the physician.

For the reasons stated, the judgment of the lower court in favor of the physician was affirmed.—*Steen et al. v. Polyclinic et al. (Wash.), 81 P. (2d) 846.*

Society Proceedings

COMING MEETINGS

American Academy of Ophthalmology and Oto-Laryngology, Chicago, Oct. 8-13. Dr. William P. Wherry, 107 South 17th St., Omaha, Executive Secretary.
American Association of Railway Surgeons, Chicago, Sept. 11-13. Dr. Daniel B. Moss, 547 West Jackson Blvd., Chicago, Secretary.
American Clinical and Climatological Association, Saranac Lake, N. Y., Oct. 9-11. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
American College of Surgeons, Philadelphia, Oct. 16-20. Dr. Frederic A. Besley, 40 East Erie St., Chicago, Secretary.
American Congress on Obstetrics and Gynecology, Cleveland, Sept. 11-15. Dr. Fred L. Adair, 650 Rush St., Chicago, General Chairman.
American Public Health Association, Pittsburgh, Oct. 17-20. Dr. Reginald M. Atwater, 50 West 50th St., New York, Executive Secretary.
American Roentgen Ray Society, Chicago, Sept. 19-22. Dr. Carleton B. Peirce, Royal Victoria Hospital, Montreal, Canada, Secretary.
American Society of Anesthetists, New York, Oct. 12. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.
Association of American Medical Colleges, Cincinnati, Oct. 23-25. Dr. Fred C. Zapffe, 5 South Wabash Ave., Chicago, Secretary.
Central Association of Obstetricians and Gynecologists, Kansas City, Mo., Nov. 2-4. Dr. W. F. Mengert, University Hospitals, Iowa City, Secretary.
Central Society for Clinical Research, Chicago, Nov. 3-4. Dr. L. D. Thompson, 4932 Maryland Ave., St. Louis, Secretary.
Clinical Orthopaedic Society, Little Rock, Ark., and Oklahoma City, Oct. 13-14. Dr. H. Earle Conwell, 215 Medical Arts Bldg., Birmingham, Ala., Secretary.
Colorado State Medical Society, Colorado Springs, Oct. 4-7. Mr. Harvey T. Sethman, 537 Republic Bldg., Denver, Executive Secretary.
Delaware, Medical Society of, Wilmington, Oct. 9-11. Dr. John H. Mullin, 601 Delaware Ave., Wilmington, Secretary.
Indiana State Medical Association, Fort Wayne, Oct. 10-12. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
Inter-State Postgraduate Medical Association of North America, Chicago, Oct. 30-Nov. 3. Dr. W. B. Peck, 27 East Stephenson St., Freeport, Ill., Managing Director.
Kentucky State Medical Association, Bowling Green, Sept. 11-14. Dr. Arthur T. McCormack, 620 South Third St., Louisville, Secretary.
Michigan State Medical Society, Grand Rapids, Sept. 18-22. Dr. L. Fernald Foster, 311 Center Ave., Bay City, Secretary.
Mississippi Valley Medical Society, Burlington, Iowa, Sept. 27-29. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.
National Society for the Prevention of Blindness, New York, Oct. 26-28. Mr. Lewis H. Carris, 50 West 50th St., New York, General Director.
Nevada State Medical Association, Reno, Sept. 22-23. Dr. Horace J. Brown, 120 North Virginia St., Reno, Secretary.
Pacific Association of Railway Surgeons, San Francisco, Sept. 29-30. Dr. W. T. Cummins, Southern Pacific General Hospital, San Francisco, Secretary.
Pan Pacific Surgical Association, Honolulu, Sept. 15-28. Dr. F. J. Pinkerton, Young Bldg., Honolulu, Secretary.
Pennsylvania, Medical Society of the State of, Pittsburgh, Oct. 2-5. Dr. Walter F. Donaldson, 500 Penn Ave., Pittsburgh, Secretary.
Vermont State Medical Society, Burlington, Oct. 5-6. Dr. Benjamin F. Cook, 154 Bellevue Ave., Rutland, Secretary.
Virginia, Medical Society of, Richmond, Oct. 3-5. Miss Agnes V. Edwards, 1200 East Clay St., Richmond, Secretary.
Wisconsin, State Medical Society of, Milwaukee, Sept. 13-15. Mr. J. G. Crownhart, 119 East Washington Ave., Madison, Secretary.

THE AMERICAN RHEUMATISM ASSOCIATION

Sixth Annual Meeting, held in St. Louis, May 15, 1939

DR. LORING T. SWAIM, Boston, Secretary

Considerations Bearing on the Treatment of Arthritic Patients: President's Address

DR. RALPH PEMBERTON, Philadelphia: The arthritic patient is abnormal not only because of deviations within his joints but also because of deviations within his body elsewhere, more or less open to modification. Systemic rest is acknowledged to be the most useful single basic factor in treatment of both great types. Use of "rest," however, is not to be interpreted as a generic panacea for patients with arthritis. It is brought forward rather as a comprehensive, though fragmentary, method of approaching that betterment of function, in many systems of the body, which makes toward a so-called reversal of the arthritic process.

I believe that, in attempting to evaluate the influence of focal infection, the conditioning factors which make infection operative or otherwise must be equally evaluated if the conclusions are to have any significance. To state that, in a given series, removal of infection is unsuccessful may be simply to state that removal is unsuccessful under conditions such that it could hardly be expected to be otherwise. Great injustice may thus be done to the significance of removing infection if it is viewed apart from its real setting: surgically rather than biologically. Removal of infection is often not so complete as supposed.

In few syndromes is nutritional imbalance more to be observed. Atrophy of bone, subvitaminosis, faulty hemopoiesis, altered plasma proteins and tissue edema are common spectacles.

Dogmatic allocation of hypertrophic arthritis to age and trauma alone leaves unbridged a philosophic chasm into which many arthritic patients are falling. Among other evidences indicating systemic disturbance, Dandurand and Scull have recently observed reducing bodies other than dextrose in the blood in hypertrophic cases in amounts significantly higher than in normal subjects.

The point of view from which the observer regards the arthritic scene is all important. To him who learns arthritis through bacteriology, few other phases of medicine may seem to touch it. To the pathologist the microscope alone reveals what is worthy of notice. To the practitioner, basic considerations may seem futile since his patients await relief from pain and want it now.

Successful therapy cannot be achieved by means of any alleged panacea or by means of such platitudes as "good hygiene, fresh air and keeping the bowels open." It can be frequently achieved, however, on the basis of a systematic and directional attempt at readjustment of all the dislocated physiologic processes accompanying and largely characterizing the disease. The future may reveal some single factor causative of the disease. By the same token, the future may hold some single remedial agency which will reach to or near the heart of the oak but we are not yet in possession of it. Perhaps gold will prove as valuable to the patient in his body as it has proved to be in his pockets.

Whether we like it or not, we must today face the fact that, lacking that final illumination of arthritis, we are definitely expected to use in the half light all such well considered measures as are available to us. At last analysis the care of arthritic patients as a whole falls on the general practitioner. He properly takes his therapeutic cue from those studying the disease and unless a reasonably wide angled and, above all, a coordinated program is presented to him he cannot be blamed if he turns from academic negativism to the samples sent him by a drug house. To know how to utilize the components of rest, to stimulate here and use sedation there, to appreciate the significance of deficiencies or surfeits, to recognize and correct them, to discover an infectious or other morbid nidus, to understand whether and when to remove it, to reeducate the patient toward his problem, to adjust his somatic and local mechanics, in sum to "equilibrate" the arthritic patient and treat him as few sufferers from other diseases are treated constitutes, in my opinion, at least an approach toward a specific therapy which must be experienced to be understood.

There is at the moment a real danger that in our separate quests for the cause of arthritis we are losing some perspective in the cause of arthritics. A chief purpose of this paper is, therefore, to present two objectives: (1) avoidance of the exclusive outlook in this vexed field and the maintenance of a balanced perspective toward all deviations presented by the patient with arthritis; (2) recognition that effective therapy often depends on coordinating the influences of many physiologic processes and that utilization of these influences can be achieved only by those actually desirous of bringing this about.

Menopause Arthritis

Dr. Francis Cooley Hall, Boston: A review of the literature indicates considerable disagreement regarding the existence or the nature of menopause arthritis, whether due to thyroid or to ovarian gland deficiency or both or neither; whether characterized merely by joint and muscle pain, or whether this is followed by true pathologic changes in the joints. These joint changes are considered to be hypertrophic in nature usually, but some authorities believe that both types can occur.

A study of seventy-one women castrates presenting symptoms of arthritis beginning a few weeks after castration seems to indicate that muscle and joint symptoms (arthralgia) can occur as one of the menopause symptoms and can be controlled, like other menopause symptoms, by adequate estrogenic therapy, except in the presence of infection, excessive physical fatigue or trauma, or excessive emotional disturbance. Control of symptoms may require from 10,000 to 20,000 rat units of estrogenic material a week for six weeks, followed by smaller doses for a varying duration of time. These patients with arthralgia have a condition often indistinguishable from early rheumatoid (atrophic) arthritis, for the two conditions may have in common insidious onset, morning pain and stiffness (worse after sleep), even slight swelling of the joint and limitation of motion, and elevated sedimentation rate. Fifty-three of the seventy-one cases I am calling arthralgia, because it cannot be proved that true arthritis was present. Of forty adequately treated, 70 per cent were almost entirely relieved of joint and muscle pain by estrogenic therapy. The others responded to a lesser degree.

Eighteen of the seventy-one castrates not only had arthralgia but showed definite signs of true arthritis of either type or mixed types. Estrogenic therapy controlled flashes, sweats and arthralgias and appeared to control the arthritis in many instances.

The evidence suggests the possibility that we are observing different stages of one process going on in the joints, the manifestations depending on the intensity and duration of the irritant, and the end result being hypertrophic arthritis in most cases but the end result being modified by overuse or disuse of the joint. The irritant would appear to be the excessive amount of anterior pituitary hormone in the absence of and due to the absence of ovarian hormones.

Menopause arthralgia, and perhaps menopause arthritis, is a distinct entity due primarily to lack of estrogenic hormone and can be controlled by adequate therapy.

DISCUSSION

Dr. William K. Ishmael, Oklahoma City: The relation of the various phases of the ovarian cycle in women to arthritis is unknown, but clinical observation certainly indicates that the two are in some way connected. To attempt control of the arthritis with various fractions of the ovarian hormones requires considerable knowledge of the nature and effects of the various principles at hand. My experience with the use of estrogenic materials in the treatment of rheumatism appearing during the menopause and in female castrates who were well before castration and whose symptoms have followed the castration follows closely that reported by Dr. Hall. I also have concluded that the results from treatment in these cases depend largely on the dose and method of administration of the estrogenic materials. It is essential that the body receive the substance in as even a flow as is possible and for this reason I have employed those materials which are contained in an oily solution. In an attempt to provide still further delay in the absorption, I have been administering the substance with 10 cc. of the patient's own blood. Work is now being done to establish this fact of delayed absorption when blood is added to a fat soluble substance before injection. In addition to the possible effect of the delayed absorption of injected materials, the injected blood also exerts the usual effects of autohemotherapy, which has been reported to be of benefit in the treatment of the complications of the menopause. In searching for some satisfactory method of treatment of those climacteric types of arthritis that failed to respond to the estrogen therapy alone, it was decided to incorporate autohemotherapy and fever along with the injections of the estrogen complex. It was gratifying to note that many of those who had failed to respond to the estrogen complex alone did respond to the combined autohemotherapy and estrogen followed by fever. Furthermore, the length of time for the remission was materially reduced in all climacteric cases. Exact figures are not yet complete on this series, as the number of cases treated is too small to justify the drawing of any conclusions at this time.

Dr. Loring T. Swaim, Boston: I have seen many cases such as Dr. Hall described, with increase of symptoms before menstruation and increase of the arthritis immediately after pregnancy and at the menopause. A woman aged 32 had typical rheumatoid arthritis before she was married. Since 1932 she had had gradual progression of the rheumatoid arthritis in the knees, feet, hands and elbows. Menstruation had been rather scanty always. She was married in 1934, became pregnant in 1935 and was quite well during the first pregnancy. The baby died during delivery. There was a tremendous emotional upset and the joints became again acutely inflamed. Menstruation was more scanty. She was pregnant again in 1936 and the joints again were better. A son was born and the joints again became inflamed three months after delivery. She became pregnant again in 1938 and the joints were again better but not as well as the first time. The baby was born in December 1938. Prior to the last pregnancy we studied the urine and examined

for estrogen. Before and during pregnancy estrogen was present. Dr. Charles Lawrence, who studied this case with me, reports "She showed just before delivery a low normal value for prolan and estrin. The first assay after delivery showed a positive prolan and a negative estrin, and all assays since then have shown negative prolans and negative estrins. It is of course quite normal for the prolan to drop fairly sharply after the pregnancy but what seemed to me significant was the rapid disappearance of estrin. . . . It seems to me that she probably has an imbalance similar to that encountered at the menopause, a definite insufficiency of estrin with, in all probability, intermittent excess of prolan." The estrogen was again balanced in January 1939, and I quote from his letter: "It is definitely certain that her joints are a good deal better and her arthritis to some degree at least is bettered for estrin." At the present time (May) her arthritis is definitely better and she feels well for the first time in years. Another case studied since October 1937 was one of typical rheumatoid arthritis. The patient came to the hospital with an acute anemia and a sedimentation rate index of 1.03 and a basal metabolism rate of minus 3. The joint condition began in 1933. Her menstruation was irregular. In 1934 she had a repair of the cervix and removal of cysts for leukorrhea. Since 1935 menstruation had been painful but there had been no discharge since the operation. Shoulders, wrists, ankles and knees had been swollen and painful. In November 1937 she had a gastric upset with no particular effect on the joints. In December 1937 she had an acute emotional upset with definite effect on the joints. In January 1938 she had tonsillitis. In February 1938 the tonsils were removed with slight improvement. In March we started her on 2,000 rat units of progynon-B and the joints were definitely better. At the present time she finds she can control the amount of pain in the joints by the use progynon taken once a week, and the objective signs in the joints have improved steadily.

DR. RUSSELL L. CECIL, New York: Several years ago Dr. Archer and I reported fifty cases of menopause arthritis, and at that time the criticism was made that we were simply complicating the picture by inventing a new name for a disease which after all was typical hypertrophic osteo-arthritis. Now the syndrome which we described was really a subdivision of hypertrophic osteo-arthritis occurring at the menopause in middle aged overweight women, with pain in the knees, fingers and lumbar spine. They had hypertrophic changes, Heberden's nodes, and so on. With reduction of weight and mild physical therapy they improved. At that time, fifteen years ago, we did not know so much about the factor of gland therapy. I must confess, however, that theelin and progynon (which seem to be rational therapy) have given me rather disappointing results. In looking back over my cases for two or three years it seems to me that I have had to depend more on physical measures, physical therapy, diet and reduction in weight than on endocrine therapy. There is no more troublesome type of arthritis to treat successfully than that occurring in middle aged women. We are inclined to call these patients psychoneurotic, but the more one sees of them the more one becomes convinced that their pains are genuine.

DR. ROBERT B. OSGOOD, Boston: I have been watching some of these cases of Dr. Hall and want to give testimony that the relief in certain cases has been dramatic, especially in the arthralgic type. I think he has been careful in the control experiments by giving one group an injection of nothing but oil and the other an injection of progynon.

DR. WALTER BAUER, Boston: I should like to ask Dr. Hall why, if overactivity of the anterior pituitary in the castrate so regularly produces arthralgia, one does not encounter this type of arthralgia more regularly in the physiologic menopause?

DR. EDWARD F. HARTUNG, New York: The effect of estrogenic substances in these cases is still one more form of constitutional therapy. It is treatment of an associated condition and surely not of a basic cause. One might in the same way interpret the effect of iron and a great many other factors of constitutional therapy which are known to be of value in these cases.

DR. PHILIP S. HENCH, Rochester, Minn.: A number of different things are meant by those who use the term "menopause arthritis." By it some simply refer to atrophic arthritis which comes on about the menopause, others simply mean hypertrophic arthritis which appears near the menopause. Still others, however, consider "menopause arthritis" to be distinct from either atrophic or hypertrophic arthritis, to be a definite and separate entity with specific clinical and pathologic characteristics of its own. But though many writers have made inferences as to its supposed pathology and have presumed that it was a villous synovitis which terminates in bony and cartilaginous reactions essentially similar to those of ordinary hypertrophic arthritis (osteo-arthritis), none of the proponents of this supposed syndrome have ever given any proof as to its pathologic identity. Until this is done, "menopause arthritis" will continue to have a most uncertain status and the term should be discarded in favor of the more correct but much less definite expression "chronic arthritis appearing in women about the menopause." When one observes the notable ameliorating effect which pregnancy exerts in some cases of atrophic arthritis, one cannot escape the notion that the endocrine glands may have much to do with articular lesions. To date my own results with theelin therapy have been disappointing and I do not believe we are yet in a position to advocate such therapy as a practical procedure. Those who do so are under considerable responsibility. In the first place, the daily cost of these products is still considerable, perhaps as much as $1 a day. Theelin is a potent material, and aside from its questionable beneficial effect on joints it may have certain unwanted effects otherwise. The fact that jaundice has the same ameliorating effect that pregnancy exerts in cases of atrophic arthritis makes me believe that the potent factor (which is probably common to both pregnancy and jaundice) is not a strictly female sex hormone nor is it bilirubin. I do not believe that theelin or any other strict female hormone is the potent common denominator. My own assays of hormones do not as yet indicate any consistent abnormality in the concentration of estrogenic hormone in cases of atrophic arthritis. But it is intriguing to realize that bile salts, some of the sex hormones, vitamin D and cholesterol (which increases in the blood during pregnancy) all contain the phenanthrene nucleus. Perhaps the antirheumatic factor, the effective antiarthritis agent for which we are all hoping, likewise contains this chemical nucleus.

DR. JACOB S. KOMINZ, Rochester, N. Y.: I have treated a small number of these menopausal cases with small doses, 2,000 units, of theelin and found little change in symptomatology. Then I gave 5,000 units twice a week and at first there was definite improvement which the patients reported. No mention was made to the patient that the dosage was increased, and after a little while the patients definitely reported improvement. The fact that the normal menopausal case has no control is another point to consider. The diminution in endocrine substance in the normal case is gradual, whereas in the surgically castrated stage it is sudden.

DR. M. H. DAWSON, New York: I should like to utter a word of caution with regard to the use of large doses of those endocrine products which may have possibly a carcinogenic effect in certain instances. In the Presbyterian Hospital we recently observed the development of a cancer of the breast in a patient who had received large doses of such an endocrine product. The breast was surgically removed and the pathologist reported that there was evidence of generalized epithelial proliferation in addition to the frank carcinoma. I think it is generally agreed that small doses of these endocrines are probably without harmful effects; but the use of large doses over a prolonged period would seem to be at least a questionable procedure.

DR. JOHN D. CURRENCE, New York: I think the endeavor on the part of some to place menopausal arthritis as a separate disease entity is one that will not hold water because in Dr. Hall's series there are definite infectious cases with high sedimentation rates, and cases of osteo-arthritic type. I think the main thing to be considered, as Dr. Hartung brought out, is that we must use estrogenic substance where it is indicated, and the amount that we must use is the amount indicated in the individual case. Certainly there can be no tried rule for the amount of deficiency in estrogenic substance, no more than in the amount of anemia in the case. Whether based on the patho-

logic classification of Nichols and Richardson or on whatever classification any clinic may use, the therapy must be individualized on a constitutional basis rather than hope for specific remedies for any given classification.

DR. FRANCIS C. HALL, Boston: In answer to Dr. Bauer's question about the occurrence of arthritis at the physiologic menopause, I believe that it does occur. I can say that it is more apt to be due to overactivity of the anterior pituitary due to estrogenic lack rather than to estrogenic lack alone. I believe it is purely an imbalance. I believe that most of these patients with arthralgia alone, and even with arthritis that come at the menopause, would get well anyway. There are patients who get well with all sorts of treatment because they are going to get well anyway. I think it is desirable that we learn something about the pathology of this condition. It seems to me as I watch these different groups that one merges into the other. The rheumatoid is indistinguishable from early osteo-arthritis but I do not feel the condition is anything more than a chronic joint irritation due to physical trauma. I do not think we need to say that it is rheumatoid or osteo-arthritis in the sense that it is specific. I have been quite conscious of the possibility of carcinoma developing from estrogenic therapy and have kept it in mind. So far there have been no cases of carcinoma from the use of estrogenic substances in the cases I have. I have stopped treatment whenever I could. Many of these people have temporary imbalance. Most of the patients, once they are relieved, are willing to stop; the fear of arthritis has disappeared. I use doses that vary. Castrates require larger doses than those with arthralgia at the physiologic menopause. Many of those will get well if given no more than 2,000 rat units weekly. They will begin to show improvement in a month. They will do better on larger doses. In the castrates I think that 10,000 rat units should be used twice a week. I have always tried to stop it after a while. In a high percentage of cases that is possible.

Sulfur Metabolism and the Effect of Sulfur Administration in Rheumatoid Arthritis

DR. R. H. FREYBERG, W. D. BLOCK, PH.D., and M. F. FROMER, B.S., Ann Arbor, Mich.: This study, at the Rackham Arthritis Research Unit, University of Michigan Medical School, was conducted primarily to answer two questions: (1) Is there a fundamental abnormality of sulfur metabolism in patients with rheumatoid arthritis? and (2) Does the administration of sulfur have a beneficial effect on the sulfur metabolism, or reflected sulfur metabolism, in rheumatoid arthritis?

Patients with typical rheumatoid arthritis in different stages and degrees of activity were fed the same constant, relatively low sulfur diet and distilled water. After a period of adjustment to this regimen, twenty-four hourly collections of urine were analyzed for nitrogen, total sulfur and all partitions of sulfur. After a control value of sulfur elimination had thus been obtained, large amounts of colloidal sulfur were administered intravenously, intramuscularly and orally, and sodium thiosulfate, and in one case also sodium sulfate, was given orally. In this way the effect of these sulfur containing medications, administered in different ways, was observed. To test the ability to detoxify indole-like substances by the formation and elimination of ethereal sulfates, thymol was administered orally, first separately and later at the time sulfur was administered. Suitable control periods separated the experimental periods. Finger-nails were analyzed for cystine before and at different times after sulfur administration. Normal persons were fed diets identical with those of the patients and studied in precisely the same manner.

The results show no important difference in the amount of sulfur eliminated or the way in which it was excreted by the arthritic as compared to normal individuals. The injection of colloidal sulfur affected the metabolism and excretion of sulfur in patients with rheumatoid arthritis in the same way as it did in normal individuals: When injected intravenously the sulfur excretion in all but one patient increased by amounts considerably greater than the amount of sulfur injected; when injected intramuscularly, the sulfur excretion in every arthritic patient was increased by amounts much greater than the amount injected. Thus the injection of colloidal sulfur actually created a deficiency of sulfur. Obviously, then, this method of treatment could not be expected to prevent or diminish a deficiency of sulfur in the body if such deficiency existed. Injected sulfur was eliminated chiefly as inorganic sulfate; there was no important increase in the conjugation of sulfur and hence no benefit could result by conjugation of toxic substances. Sulfur given orally in colloidal form and as sodium thiosulfate affected the same changes in the arthritic as in the normal individual; there was no increase in conjugation of sulfur. Thymol was readily conjugated with sulfuric acid by the arthritic patients and the controls similarly, thus indicating no impairment of this detoxifying mechanism and no need for sulfur medication on this account. Our analysis of finger-nails showed no changes in the cystine content after sulfur medication. No evidence of sulfur deficiency or abnormality in sulfur metabolism was found to exist in patients with rheumatoid arthritis. The data of this study reveal no biochemical or metabolic indication of need for, or benefit from, sulfur medication in the treatment of rheumatoid arthritis.

DISCUSSION

DR. BEN D. SENTURIA, St. Louis: My own work done over five years ago and limited, however, to the determination of total urinary sulfur and its partition is well in accord with the conclusions of the authors. After I found that there was no sulfur deficiency or abnormal sulfur metabolism in these patients, the continued use of sulfur was based on what appeared to be a nonspecific effect. The studies of Dr. Freyberg and his associates may indicate the nature of the nonspecific effect. It was noted that after the intramuscular administration of colloidal sulfur there occurred a marked increase in the output of total sulfur, as much in some instances as 200 per cent of the amount injected. It would be of extreme interest to know what the total nitrogen elimination was in order to determine the nitrogen-sulfur ratio for this period. Possibly the increase in sulfur came from an increase in protein catabolism resulting from the colloidal sulfur administration. I should like to ask what the total urinary nitrogen was for that period in which the marked increment in sulfur excretion occurred; also whether the authors feel that their investigations preclude the possibility of a nonspecific effect from intravenous and intragluteal injections of colloidal sulfur. Finally, let us hope that with the publication of Dr. Freyberg and his coadjutors' instructive experiments such unwarranted statements as "sulfur deficiency," "derangement of sulfur metabolism," "increased sulfur catabolism," "sulfur-hungry tissues" and "deficiency thiopexy" in rheumatoid arthritis will vanish from the literature.

DR. J. ALBERT KEY, St. Louis: I used sulfur in the beginning. I did not like it because it had to be given intravenously or intramuscularly, and occasionally it caused a thrombosis of the vein. I did not notice any difference between the group that got sulfur and those who did not, so I stopped using it. Before we accept new drugs for the treatment of chronic arthritis we should follow them over a period of years on a group of patients and, if possible, we should have studies like this of Dr. Freyberg and his co-workers. Unfortunately, there are few institutions that have facilities for this type of work, but to me this paper is the swan song of sulfur.

DR. WALTER BAUER, Boston: Dr. Freyberg and his colleagues have shown conclusively that the administration of sulfur is deleterious and not beneficial to the mystical sulfur deficiency of rheumatoid arthritis. The supposed sulfur deficiency has served as one of the arguments for using sulfur therapy in this disease. Each newly proposed antirheumatic drug should be similarly investigated as soon as possible. If this were done more often, many new forms of therapy would be quashed before gaining sufficient popularity to become an expensive, useless luxury for the all too poor rheumatoid arthritic patients. In our clinic our experience with sulfur has been limited but disappointing. Dr. N. R. Abrams followed fourteen patients over a period of two years. These fourteen patients had been under observation from one to five years before therapy was instituted. No one of them showed any objective improvement following the intravenous administration of large doses of colloidal sulfur. Fifty per cent of our patients were subjectively improved. Such improvement never lasted more than three months. In only two instances were the sedimentation rates reduced, and this effect did not persist. I think Dr.

Freyberg's results are so clearcut that we can all feel that we are not neglecting our rheumatoid arthritic patients if we do not administer sulfur.

DR. ISADORE PILOT, Chicago: Dr. Reed of Chicago has for some time been studying the sulfur partition and sulfur balance in a larger series of cases than Dr. Freyberg presented and his figures are almost identical, showing no great difference in the normal partition and the total sulfur values in the urine in the normal as well as the rheumatoid type of arthritis. Dr. Reed had his normal and rheumatoid arthritis cases on tremendous doses of vitamin D, from 100,000 to 150,000 units, his chief purpose being to study the physiologic effect of these large doses on normal and rheumatic individuals. The sulfur values in the urine were increased in the arthritic as compared to the normal; apparently there is some difference in the handling of sulfur in the arthritic as compared with the normal. Whatever therapeutic significance there may be in connection with vitamin D I am unable to say. At any rate our work is confirmatory of Dr. Freyberg's studies.

DR. BERNARD I. COMROE, Philadelphia: Our results at the University of Pennsylvania were similar to those of Dr. Freyberg and his co-workers. During the course of hundreds of analyses of nails for cystine content we found no marked difference among arthritic and nonarthritic patients. However, in a small group of carefully controlled patients with rheumatoid arthritis, 20 per cent were markedly improved both subjectively and objectively following parenteral sulfur therapy; an additional 30 per cent were moderately improved. This may be entirely a nonspecific reaction due to the protein which is present in most preparations of colloidal sulfur.

DR. H. M. MARGOLIS, Pittsburgh: While the circulars and advertisements from some pharmaceutic manufacturers are today urging the physician to follow the lead of those who have reported excellent therapeutic results with sulfur in rheumatoid arthritis, Dr. Freyberg and his co-workers show that careful metabolic studies in a group of rheumatic patients reveal no deviation from normal in the metabolism of sulfur. They show that the concentration of sulfur, in its various forms, in the blood of patients with rheumatoid arthritis is essentially the same as it is in normal control individuals. They show, furthermore, that if a deficiency of sulfur in the tissues existed it could not be remedied by the administration of sulfur, since it is excreted about as fast as it is injected parenterally, or ingested. How, then, explain those results which have been reported by occasional observers who have felt that the administration of sulfur to patients with rheumatoid arthritis has resulted in benefit to those patients? I am inclined to believe that the given "percentage" of cases reported to have benefited from the administration of sulfur improved during the administration of sulfur but not as a result of it. There is no questioning the psychologic effect of an injection—of any type of injection—in certain arthritic patients. And I believe that the beneficial effect ascribed to sulfur may be more correctly ascribed to some favorable psychogenic influence of the injections or to the well known tendency to spontaneous temporary remission in the severity of arthritic manifestations. Several years ago I stated unequivocally in a publication of mine that our experience with sulfur was altogether unsatisfactory; that we never noted any beneficial effect from its administration. And yet I am aware that many physicians are still employing sulfur as the chief, if not the sole, therapeutic remedy for their arthritic patients. About a year ago I sent a questionnaire to the members of our association inquiring about their experience with sulfur therapy, as well as some other therapeutic measures. More than a hundred were good enough to answer this questionnaire. All but a very few of those that answered our questionnaire had either discontinued the use of sulfur altogether or were using it without much confidence in its value. It appears that there are several geographic spots where sulfur therapy still holds a place of some importance in the therapeutic regimen, but elsewhere it does not. How can we most effectively broadcast what little rational basis there is for the hope that anything can be accomplished through the use of sulfur in the treatment of arthritis?

DR. R. H. FREYBERG, Ann Arbor, Mich.: We were surprised that the sulfur excretion increased more than the amount of colloidal sulfur injected. To explain this, we thought that perhaps the intramuscular injection of sulfur might have caused muscle breakdown which would contribute sulfur for elimination. To provide so much sulfur, however, the necrosis of quite a large amount of muscle would be necessary. This should then cause a corresponding increase in nitrogen elimination. No appreciable change was observed in the nitrogen excretion during these periods. To study this possibility further, one subject was injected intramuscularly with a medication which contained no sulfur but which caused essentially the same amount of change in the muscle at the site of injection as did colloidal sulfur. The results indicate that no important change in sulfur elimination occurred; hence we feel that muscle breakdown cannot explain the large sulfur excretion observed. It is possible that sulfur has a "nonspecific beneficial effect," as suggested by one of the discussers. The studies I reported this morning were designed to answer certain specific questions regarding sulfur metabolism and in an effort to detect any way in which sulfur could be beneficial. We have no information concerning "nonspecific effects." I am in agreement with Dr. Key, who so well stated in his discussion that if sulfur therapy is beneficial to patients with rheumatoid arthritis its effect must be accomplished in some mysterious way.

Further Observations of the Use of a High Fat Diet in Gouty Arthritis

DR. L. MAXWELL LOCKIE and ROGER S. HUBBARD, PH.D., Buffalo: In 1935 a paper was published describing results obtained when a diet high in fat was fed to patients with gouty arthritis. The results could be considered under two headings: the effect on the blood uric acid and the effect on the symptoms of the patients. The effect on the blood uric acid resembles fairly closely the effect of such diets on normal patients described by Harding and others; increases in the blood uric acid values were usually observed after the diet had been instituted and continued for a minimum period of about five days. The effect on the symptoms was striking.

Since this paper was presented, five more experiments have been carried out. The results are essentially similar to those obtained earlier, but certain irregularities in the observations have become noticeable in the more extended series. The most important of these irregularities have been connected with the symptoms. While an exacerbation of the disease has failed to occur in only one instance, a patient who was studied for five days, the time that has lapsed before the symptoms developed has varied from two to sixteen days. Since both extreme periods were noted in studies on the same patient, it is evident that an explanation for the variations cannot be readily suggested. Another finding in these experiments, which was not reported previously, was an increase in temperature which occurred in the majority of the patients after they had been placed on diets high in fat. This frequently reached 102 F.

When diets high in fat are ingested by patients with gouty arthritis, an acute attack of the disease usually develops. This exacerbation is not closely related to measurable changes in the blood uric acid which frequently result when such diets are given.

DISCUSSION

DR. PHILIP S. HENCH, Rochester, Minn.: The authors have made three propositions: (1) that a high fat diet is often harmful to gouty patients, (2) that it is so consistently harmful as to provide a provocative test that is useful in the diagnosis of gout, and (3) that a diet rich in carbohydrates is distinctly helpful. The first proposition, namely, that a high fat diet is often harmful, seems to be strongly suggested not only by the observations of Drs. Lockie and Hubbard but also by others. A few years ago when we were treating infections of the urinary tract with a ketogenic diet I observed a frequent, though not a consistent, provocation of acute gouty arthritis in cases of quiescent gout. My experience with gout seems to indicate that just after an acute attack the patients are temporarily "immune" to another attack for a short time at least. Assuming that the attacks in Dr. Lockie's patients were really over, it is interesting to note that the high fat diets were able to provoke attacks within one to two weeks of a previous attack, that is, in the supposedly "refractory period." In most cases of gout the clinical features of the gout and the pattern of gouty arthritis are so characteristic that provocative tests are unnecessary. In

other cases, however, an effective provocative test would be useful (1) to convince the physician himself that gout was actually present in doubtful cases and (2) to convince a doubting, uncooperative patient that he actually had gout. I doubt if Dr. Lockie could maintain this high percentage of positive provocations if he applied the test to early, mild cases, that is, to those cases in which we especially need an effective diagnostic test. I have studied the effect of this "provocative diet" in several cases of classic gout but I obtained a positive test in a much smaller percentage of cases. Dr. Lockie noted frequent relief after a high carbohydrate diet had been used for two days. Did the patients obtain relief because carbohydrate was given or simply because fats were reduced? In other words, do carbohydrates have a positive beneficial effect? High carbohydrate diets will apparently reduce the concentration of uric acid in the blood of gouty patients with normal renal function but not in cases of renal insufficiency. The study of Drs. Lockie and Hubbard provides further evidence that uric acid has little or nothing to do with the cause of acute gouty arthritis even though its deposits may well be the sole or main cause of the later chronic gouty arthritis. Cholesterol is present in tophi and is increased in the blood in some cases of gout. It would seem to be important to study the comparative concentrations of fat in the blood and tissue in cases in which the results of provocative tests are positive and negative. Perhaps some by-product of abnormal fat metabolism is more important than that of purine metabolism. Just as juvenile diabetes is generally more severe than adult diabetes, so patients with juvenile gout generally fare far worse in a given number of years than do those patients whose gout begins in middle life. Juvenile gout exhibits a greater factor of hereditary gout, more rapid progression and more severe manifestations of gout and often terminates fatally in the fourth decade of life. It should also be noted that some of the induced attacks were febrile and some were not; some involved great toes, others did not but were polyarticular. Contrary to the views of many physicians, gouty arthritis does not express itself only as a red, painful great toe.

DR. WALTER BAUER, Boston: The data presented suggest that the administration of a high fat diet to patients with gout would in most instances be followed by an attack of gouty arthritis. How should we interpret these data? One patient may give a history of having had one attack of gouty arthritis each year for five years, followed by a free period of ten years, yet subsequently fall ill with attacks of gouty arthritis every three to six months. A second patient may suffer from chronic gouty arthritis beginning with his first attack. These variations in clinical course make it extremely difficult to evaluate a provocative test such as the one proposed this morning, because we cannot speak with certainty concerning the exact course of the disease or predict when a given patient is due to have an attack of gouty arthritis. Daily variations of the serum uric acid are encountered in gouty patients even when kept on a constant metabolic regimen. In some instances the variations have been as great as 5 mg. per hundred cubic centimeters. In certain cases fairly regularly recurring cyclic changes in the serum uric acid are observed. In some the serum uric acid may fall prior to an attack of arthritis; in others it may rise or remain unaffected. The same type of alterations of uric acid excretion may precede an attack of gouty arthritis. I believe that many of the experiments reported this morning were done too soon after the last attack of gouty arthritis. In some cases the provocative test may have been tried before the previous attack had subsided completely. If such was the case, it makes it extremely difficult to interpret the results. We need a provocative test for gouty arthritis which will always induce an attack of gouty arthritis in the individual with gout irrespective of when the last attack occurred. Furthermore, it would be more convincing if the proposed provocative test induced such an attack in two or three days and did not require from ten to fourteen days before doing so. The reductions of the serum uric acid of certain patients following the administration of a high carbohydrate diet are not significant. They may represent natural fluctuations. As Dr. Hubbard has pointed out, the administration of a high carbohydrate diet may or may not affect the serum uric acid level. Even if the serum uric acid remained at a lower level, one has no assurance that the patient will be protected against future attacks. I believe the results would be of more significance if carried out repeatedly on the same individuals. The patients of choice are those without tophi, whose first attack of arthritis came early in the fifth decade and whose attacks have been recurring about every eighteen months. If the provocative test induces attacks regularly in this type of individual, it would appear to be of diagnostic use.

DR. EPHRAIM GOLDFAIN, Oklahoma City: In the treatment of some few cases that I have had in the last few years I have found that regulation of the daily dietary intake is of great importance. The diet consists of about 2,000 calories in twenty-four hours, having a ketogenic-antiketogenic ratio of one to two. The foods are so arranged that there will be a preponderance of alkaline mineral ash. The foods listed are such as will contain as large an amount of vitamins as is possible. Important food items in such daily dietary are three slices of whole wheat bread, two eggs, at least two green vegetables and two cooked vegetables, two fresh raw fruits and a pint of milk. After a certain period of time has elapsed, if it is found necessary to increase the caloric value of their diet this is done. The ketogenic-antiketogenic ratio is maintained as set forth.

DR. CURRIER MCEWEN, New York: I have followed the work of Drs. Lockie and Hubbard and have tried similar studies in a few cases. In each case the period of study was divided into four periods: (1) one week in the ward on an ordinary diet, (2) two weeks on a high fat diet—the fat content being up to 298 Gm. a day, (3) one week on a high carbohydrate-low fat diet and (4) two weeks on a high purine diet. In one case this regimen was followed by another week of high carbohydrate-low fat and another two weeks of high fat-low carbohydrate diet. There were five patients studied who I believed had gout. Three of the patients on the regimen just mentioned developed definite arthritis during the period on the high fat diet, which subsided during the period on the high carbohydrate diet and then returned promptly when the high purine feedings were started. Two of the patients thought to have gout did not experience exacerbations. Two patients with hypertensive heart disease and two normal medical students, who were included as controls, all had a rise in blood uric acid on the high fat and high purine diets but had no joint symptoms. Two patients with perfectly typical and rather advanced rheumatoid arthritis developed a rise in the blood uric acid similar to that shown by the normal persons. In addition, both patients had exacerbations of joint pain, one during the high fat and the other during high purine feedings. Probably these exacerbations were purely coincidental. The patient who was the most instructive was a hospital orderly who was under observation for three years. He was the one who had the extra two periods of high carbohydrate and high fat diets. He developed pain during both periods of high fat diet but more severe attacks during both periods of high purine feeding. One of the striking things about the reactions to the diets of this patient was the complete dissociation between blood uric acid level and his joint symptoms. One time there would be pain with blood uric acid of 5 mg. and several weeks later the level would be 10 mg. or above for more than a week before pain would appear. As far as its value as a therapeutic test is concerned, I question the usefulness of the high fat diet, first because it is too unpleasant for the patient to take over the period of ten or more days which may be necessary and second because it does not seem to be always effective.

DR. L. MAXWELL LOCKIE, Buffalo: It is our hope that in the future we shall be able to study the earlier and milder cases in an effort to learn more from a metabolic point of view. The question of a refactory period following attacks is another phase which must be investigated.

Foreign Body Arthritis

DR. J. ALBERT KEY, St. Louis: Chronic arthritis developed in five cases as a result of foreign material entering the joint from the outside and remaining in the joint over a variable period. In two of the instances the condition was complicated by a low grade infection.

The first of these was a thorn, the point of which was broken off in the knee joint of a 10 year old girl and remained seven weeks. A subacute arthritis developed and arthrotomy with

hemisynovectomy, which included the tissue surrounding the tip of the thorn, resulted in an apparently normal knee.

In the second case a bullet entered the knee joint and remained embedded in the lateral condyle of the femur approximately three months. This was also mildly infected. Forty-five years later the man had a marked arthritis in this knee with degeneration of the cartilage and limitation of movement.

In the third case a needle remained embedded in the fat pad of the knee for twenty-five years. In this joint extreme hypertrophic arthritis developed. Marked improvement resulted from removal of the needle and the semilunar cartilage and thickened fat pad.

In the fourth case a piece of glass entered the calf of the leg fourteen years previous to operation and had wandered down to become lodged in the posterior portion of the ankle joint. A degenerative arthritis in the ankle was not relieved by removal of the glass and an athrodesis of the ankle was necessary.

In the fifth case a lead bullet was embedded in the articular surface of the head of the astragalus four years before operation. The x-ray examination showed infiltration of the synovial lining with lead and at the operation there was marked degeneration of cartilage in the vicinity of the bullet. Removal of the diseased bone and of much of the hyperplastic synovial lining resulted in only partial relief.

It is to be noted that if a foreign body is permitted to remain in the joint, or even embedded in the synovial tissue near the joint surface, a progressive degenerative arthritis may be expected to develop.

DISCUSSION

DR. JOHN P. STUMP, New York: Many patients with embedded foreign bodies have been advised to ignore them, because it was felt that they were stationary, encapsulated and unimportant. Dr. Key seemed to imply that he felt the first tissue of the joint to respond to foreign body irritation was the synovial membrane. This is in keeping with the knowledge of response of joint structures to any irritation. In the pathologic description of the material removed from several of his patients, Dr. Key emphasizes the proliferation of the normal villous formation of the synovial membrane. When irritated the synovial membrane will proliferate and the normal villi become elongated, thickened and fibrotic. This is true in a number of conditions. On examination of joints, especially the knees, these fibrotic villi can be felt moving in and out of the joint space. They should be properly recognized and not considered loose cartilage or joint mice. It is of primary importance that the crepitation of villous synovitis should not be considered as due to osteo-arthritis. Of outstanding significance in Dr. Key's presentation is the fact that he has shown localized irritation in, or adjacent to, a joint can initiate an inflammatory process which will extend to involve all the articular structures and result in the destruction of the joint. He furthermore indicates that with the removal of the irritant there is disposition on the part of the joint structures to return to normal. There seems to be a similarity between the way the joints Dr. Key described reacted to local foreign body irritants and the manner in which joints react to static strain. Faulty body mechanics causes strain on ligamentous supports of joints, and the close relation of the supporting structures to the synovial membrane causes an irritation of that membrane resulting in a true synovitis. Once this synovitis starts it advances and in its proliferation—especially villous proliferation—acts as an additional irritant to the joint and leads to an inflammatory reaction, which will end in a destruction of the joint. Here again, if the institution of normal body mechanics removes the irritant early enough, the joints will return to normal.

DR. ROBERT B. OSGOOD, Boston: It seems rather clear that the causes for irritation which Dr. Key finds must be either that of a low grade infection or because of the acutely irritative nature of the foreign body. If this is so, we have got to revise many of the ideas that are now taking ground, basing indication for operation on the fact that the foreign bodies represent causes of irritation. You may be familiar with the report of Dr. Smith-Petersen on the use of vitalium molds. On examining patients months or years after putting in molds, he found a smooth surface over the bone, a fibrocartilage approaching hyaline cartilage in structure. So far these metal molds have not caused any irritation, as the material in the foreign body is nonirritative in nature itself. One would think that the synovial membrane of the joint would become irritated, and perhaps it will. Perhaps Dr. Key's paper suggests that experimenters with some of these interesting foreign materials inside the joint may yet revise their methods, and perhaps Dr. Key may have to revise his idea of the irritative nature of a foreign body inside the joint. I well remember my first experience with a foreign body in a joint. A man came in with a stiff, painful knee. The only history I could get was that once when he was a foreman he had crashed through a window. I took a roentgenogram and found eight pieces of what I took to be glass inside the knee joint. I said they should be removed. It was in a neighboring town and I felt obliged to go down and take out the pieces of glass. We found there was no knee joint at all, working for an hour and finding nothing but evidences of synovial membrane degeneration and fibrosis. At the end of an hour and a half I sewed up the joint without having found one single piece of glass.

DR. JOSEPH FREIBERG, Cincinnati: I should like to ask Dr. Key whether there is any essential difference between the reaction of the knee joint to foreign bodies, such as a needle or a piece of glass, and the smooth round body which we see occurring frequently in the knee joint apparently spontaneously, with osteochondritis dissecans and other conditions. It is my experience that the reaction of the joint is exactly similar, occurring possibly more gradually and over a longer period of time. I should like to know whether Dr. Key feels there is any particular difference in this type of resistance.

DR. M. N. SMITH-PETERSEN, Boston: The foreign bodies referred to in Dr. Key's paper are not inert; consequently they brought about foreign body reaction with excess scar formation which secondarily interfered with the mechanics of the joint. If, on the other hand, an inert foreign body is present which allows normal joint function, not only is there absence of traumatic arthritis but the process of repair will be such that normal joint structures will be the result. This has been my experience in patients on whom an arthroplasty of the hip by means of a vitalium mold has been performed. The vitalium mold is a huge foreign body but it is inert and therefore causes no foreign body reaction. Furthermore, since it allows physiologic function, the process of repair results in the creation of joint surfaces approaching the normal hyaline cartilage.

DR. WALTER BAUER, Boston: I should like to add a few words concerning Dr. Smith-Petersen's arthroplasty. In doing this particular operative procedure he denudes the head of the femur of all traces of the articular cartilage. When he finishes, the entire underlying subchondral bone is exposed. Subsequently proliferation of the fibrous tissue of the subchondral bone spaces takes place. This proliferating fibrous tissue later becomes fibrocartilage and occasionally has the appearance of an imperfect type of hyaline cartilage. Taking place, as it does, underneath a close-fitting vitalium cup, the end result is a perfectly smooth acetabular head covered with the type of cartilage described.

DR. J. ALBERT KEY, St. Louis: In answer to Dr. Freiberg's question, the result of irritation by foreign body is similar to that caused by joint mice, except that in my relatively limited experience the degeneration caused by a foreign body progresses more rapidly and progresses considerably farther than does that produced by a loose piece of bone or cartilage in the joint. Strange as it may seem, I did not think of Dr. Smith-Petersen's vitalium cup arthroplasty in connection with this paper. I think I should have done so. I have always felt when I did an arthroplasty that I was not expecting to get a normal joint. I was hoping to get something that would work without pain. I think the results he has shown me from his arthroplasty are better than anything I have ever obtained or have seen any one else obtain. The important thing about these cases is that the cartilage of the joint is destroyed and it does not regenerate. The reaction of the synovial membrane to a mild irritation is a proliferative reaction. The reaction of cartilage is a degenerative reaction. Once extensive degeneration occurs in the cartilage, the joint is gone. Consequently, foreign bodies in or near joints should be removed.

(To be continued)

Current Medical Literature

AMERICAN

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Titles marked with an asterisk (*) are abstracted below.

American J. Digestive Diseases, Huntington, Ind.

6: 305-360 (July) 1939

Study of Bacterium Necrophorum in Chronic Ulcerative Colitis and Effect of Sulfanilamide in Treatment. G. M. Dack, J. B. Kirsner, L. R. Dragstedt and R. Johnson, Chicago.—p. 305.
Hydrogen Ion Concentration of Human Feces, Urine and Ileac Dejecta. E. G. Wakefield and Marschelle H. Power, Rochester, Minn.—p. 308.
Present Status of Radiologic Diagnosis of Duodenal Ulcer. M. Feldman, Baltimore.—p. 309.
Intestinal Phase in Urologic Disease: II. Role of Colon in Uro-Infections. R. Turell, New York.—p. 312.
Our Present Knowledge of Action and Sources of Copper in Nutritional Anemia. C. P. Segard, Leonia, N. J.—p. 315.
Experimental Study of Rhythmic Contractions in Small Intestine of Dog. D. M. Douglas and F. C. Mann, Rochester, Minn.—p. 318.
Experimental Study of Chemical Inhibitors of Gastric Acidity. F. D. Mann and F. C. Mann, Rochester, Minn.—p. 322.
*New Effective Parasiticide in Giardiasis. L. M. Morrison and W. A. Swalm, Philadelphia.—p. 325.
Diastase Activity of Blood and Urine when Pancreatic Ducts Are Permanently Closed. L. A. Golden, L. A. Sieracki, M. B. Handelsman and J. H. Pratt, Boston.—p. 327.
Studies in Human Biliary Physiology: III. Effect of Bile and Vitamin K on Experimentally Produced Hemorrhagic Diathesis in a Human with a Total External Biliary Fistula. I. C. Zuckerman, B. Kogut, M. Jacobi and J. Y. Cohen, Brooklyn.—p. 332.
Factor of Occult Hepatic and Biliary Tract Disease in Cases of Allergy. H. Shay, J. Gershon-Cohen and S. S. Fels, Philadelphia.—p. 335.
An Interesting Case of Ascariasis. A. Bassler, New York.—p. 338.

New Parasiticide for Giardiasis.—Morrison and Swalm discuss the efficacy of atabrine in the treatment of giardiasis. They present the results obtained in ten carefully and intensively studied cases, although they used the drug in many more cases. They administered approximately the same average dose as is employed in malaria, 1½ grains (0.1 Gm.) three times daily taken orally for five days. Then an interval of one week elapsed before a similar dose was again administered, if necessary. In this way any possibility of a toxic reaction was avoided, although toxic symptoms were not encountered. The treatment is thus simple and comparatively inexpensive. Atabrine was a completely successful parasiticide in nine of the ten cases. Eradication of the parasite caused complete abolition of symptoms in some cases, moderate improvement in others and no improvement in certain others. This observation may also represent the pathogenicity of the parasite in each instance, and it may not. However, despite the absence of "control" studies, atabrine is definitely helpful clinically in some of the cases. In those cases in which the giardia is a secondary invader, symptoms persist as long as the fundamental cause persists, despite the eradication of the parasites. The authors of articles in the foreign literature are unanimous in not finding any recurrences up to two years following the use of atabrine. This has been the experience of the present authors with their patients.

American Journal of Hygiene, Baltimore

30: 1-32 Section A (July) 1939. Partial Index
1-46 Section B
1-40 Section C
1-34 Section D

Section A

Effect of Diet on Experimental Tumor Production. C. A. Baumann, H. P. Jacobi and H. P. Rusch, Madison, Wis.—p. 1.
Bacterial Filtering Efficiency of Human Nose. R. Rooks, Iowa City.—p. 7.
Familial Susceptibility to Stillbirths and Neonatal Deaths. Elizabeth M. Gardiner and J. Yerushalmy, Albany, N. Y.—p. 11.

Section B

Comparative Study of Old Tuberculin and Purified Protein Derivative. R. M. Seideman.—p. 1.
Leukocidal Activity of Typhoid Filtrate. E. W. Dennis and H. Senekjian, Beirut, Lebanon, Syria.—p. 21.

Section C

Effects of Quinine and Plasmochin Administration on Parasite Reproduction and Destruction in Avian Malaria. G. H. Boyd and M. Dunn, Athens, Ga.—p. 1.
Transmission of Immunity in Experimental Trypanosomiasis (Trypanosoma Cruzi) from Mother Rats to Their Offspring. M. H. Kolodny, New York.—p. 19.

Section D

Observations on Some Ascarids from a Chimpanzee (Pan Troglodytes), with Experimental Studies on Susceptibility of Monkeys (Macaca Mulatta) to Infection with Human and Pig Ascaris. D. L. Augustine, Boston.—p. 29.

American Journal of Medical Sciences, Philadelphia

198: 1-148 (July) 1939. Partial Index

Anterior Pituitary Tumor Associated with Cachexia, Hypoglycemia and Duodenal Ulcer. M. P. Foley, A. M. Snell and W. M. Craig, Rochester, Minn.—p. 1.
Acute Lobar Pneumonia in Adults Treated with Sulfapyridine: Report of Fifty Cases. F. J. Smith and R. J. Needles, Detroit.—p. 19.
Results of Sulfapyridine Therapy in 400 Cases of Typed Pneumococcic Pneumonia. D. S. Pepper, H. F. Flippin, L. Schwartz and J. S. Lockwood, Philadelphia.—p. 22.
Use of Sulfanilamide in Acute Suppurative Arthritis Due to Hemolytic Streptococcus. W. W. Spink, Minneapolis.—p. 35.
Note on Ocular Symptoms Occurring from Malnutrition in Human Beings. T. D. Spies, Cincinnati.—p. 40.
*Familial Polycythemia. S. B. Nadler and I. Cohn, New Orleans.—p. 41.
Renal Arteriolonecrosis Without Papilledema. A. A. Goldbloom and A. Lieberson, New York.—p. 52.
Changes in Lactic Acid, Hydrogen Ion Concentration and Gases Produced in Blood of Normal and Schizophrenic Subjects by Exercise. J. M. Looney, Worcester, Mass.—p. 57.
*Congo Red: Toxicity and Systemic Actions. A. P. Richardson and J. R. Dillon Jr., San Francisco.—p. 73.
Id.: Absorption, Distribution and Sojourn in Blood. A. P. Richardson, San Francisco.—p. 82.
Id.: Hematologic Actions. A. P. Richardson, San Francisco.—p. 87.
Bronchographic Study of Apparently Healed Lung Abscesses. R. M. Franklin, Valhalla, N. Y.—p. 95.
Circulatory Effects of Volatile Amphetamine (Benzedrine Inhaler). C. M. Peters and J. M. Faulkner, Boston.—p. 104.

Familial Polycythemia.—Nadler and Cohn report the occurrence of four cases of polycythemia in one family. Eleven members of a family of thirteen (two siblings were not available for examination) were studied. The mother stated that of her eleven children only four had "red faces" from the time of birth. None of the children had any significant disease in their past histories. There was no evidence of factors which might initiate a secondary polycythemia—physical examination, x-ray studies and spectroscopic examination of the blood failed to reveal congenital heart disease, extensive pulmonary lesions or the presence of abnormal blood pigments. The environmental factors were similar for all members of the family. All four children had a ruddy complexion and the only physical abnormality observed was the presence of Little's disease in one case. The bleeding time, coagulation time, clot retraction, platelet count and icteric index were within normal limits in all cases. Spectroscopic examination failed to reveal the presence of abnormal pigments. There was no significant alteration in the erythrocyte count, hemoglobin content, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin or mean corpuscular hemoglobin concentration of seven other members of the family. In contrast to this there were rather marked changes in the blood pictures of the four patients. These four children had erythrocyte counts ranging from 7.48 to 8.8 million per cubic millimeter, and hemoglobins ranging from 21 to 24.3 Gm. per hundred cubic centimeters of blood. The hematocrits are approximately 150 per cent of normal. The mean corpuscular volumes, mean corpuscular hemoglobins and mean corpuscular hemoglobin concentrations were within normal limits. In contrast to the common finding of leukocytosis with preponderance of neutrophils in polycythemia vera, these cases showed normal or subnormal leukocyte counts with no abnormality of the differential pattern. Similar blood pictures are found in the majority of cases of familial polycythemia. Since cases of familial polycythemia seem to differ from classic cases of polycythemia vera in that elevated metabolic rate, neutrophilic leukocytosis, splenomegaly and symptoms referable to this disease are not a striking feature of familial polycythemia, the authors assume that familial polycythemia is not the same as polycythemia vera. However, in

their cases of polycythemia the erythrocyte mass was of the magnitude of that found in polycythemia vera. Since Haden finds an increase in cell mass to be characteristic of polycythemia vera, it now seems justifiable to include "famial polycythemia" in the group of cases of polycythemia vera.

Toxicity and Systemic Actions of Congo Red.—Richardson and Dillon add to the present meager and incomplete pharmacologic data on the toxicity and general actions of congo red. They discuss the toxicity, fatal doses, cause of death and muscular actions in different animals. They find that in more than 60 per cent of the animals (rats, cats, rabbits and pigeons) the intravenous fatal dose of congo red varies from about 150 to 250 mg. per kilogram of body weight. The toxic symptoms are characterized by general depression and collapse. The dye is less toxic in dextrose than in saline solutions. The cause of death from congo red is circulatory collapse as a result of direct cardiac depression. Cardiac muscles of the perfused turtle heart and frog ventricle and excised rabbit auricle are generally directly stimulated by congo red, as indicated by an increase in tone and stoppage of the heart in systole; the frog ventricle shows variations in reaction. Congo red stimulates directly the smooth muscles in the isolated bladder, pregnant and nonpregnant uterus and intestine by a direct action on the smooth muscle. Reactions of these organs to autonomic drugs are not changed by the dye.

American J. Obstetrics and Gynecology, St. Louis

38: 1-186 (July) 1939. Partial Index

Experience with Surgical and Radiation Therapy in Carcinoma of Corpus Uteri. W. P. Healy and R. L. Brown, New York.—p. 1.
*Excretion of Free and Acetylsulfanilamide in Human Breast Milk. Lucile R. Hac, F. L. Adair and H. C. Hesseltine, Chicago.—p. 57.
Preliminary Report on Use of Sulfanilamide in Puerperal and Postabortal Infections. T. J. Morris, Chicago.—p. 67.
Use of Sulfanilamide Derivative in Treatment of Gonorrhea in Pregnant and Nonpregnant Women. E. J. Bomze, P. G. Fuerstner and F. H. Falls, Chicago.—p. 73.
Abortions in Relation to Viable Births in 10,609 Pregnancies: Study Based on 4,500 Clinic Histories. E. K. Brunner, New York, and L. Newton, Bridgeport, Conn.—p. 82.
Malaria in Relation to Obstetrics and Gynecology. L. A. Balasquide, Ponce, Puerto Rico.—p. 91.
Streptococcus Viridans Endocarditis in Pregnancy, with Three Case Reports. E. W. Page, Berkeley, Calif., and J. V. Campbell, Oakland, Calif.—p. 97.
Review of Records of Syphilitic Pregnant Women Treated at Los Angeles Maternity Service Over a Ten Year Period. C. R. Halloran, Los Angeles.—p. 135.
*Treatment of Gonococcic Vaginitis by Estrogenic Hormone. A. Jacoby, D. E. Madonia, S. M. Till and T. H. Wood, New York.—p. 140.
*Inhibition of Lactation During Puerperium by Anterior Pituitary and Ovarian Extracts. R. A. Cacciarelli, Newark, N. J.—p. 149.
Longevity of Human Spermatozoa. G. L. Moench, New York.—p. 153.
Asymptomatic Axial Rotation of Full Term Uterus Through 180 Degrees. B. J. Hanley, Los Angeles.—p. 164.

Excretion of Sulfanilamide in Breast Milk. — In an effort to determine whether prolonged use of sulfanilamide would result in an accumulation of the drug in breast milk sufficient to be detrimental to the nursing baby, Hac and her associates gave from 2 to 5 Gm. of sulfanilamide to twenty-five normal lactating women. The drug was administered in six doses daily for a period of three days during the first nine days of the postpartum period. The free and acetylsulfanilamide levels were determined in the blood, milk and urine. The level of the drug in the milk was considerably higher than that in the blood. The drug was still being excreted in the milk in measurable, but negligible, amounts forty-eight hours after its administration had been discontinued. The percentage of the sulfanilamide excreted in the conjugated acetyl form was relatively low the first day the drug was administered, increased slightly the second and third days, and rose sharply the fourth and fifth days when administration of the drug had been discontinued. The percentage varied from 35.1 to 83.9. The same general course was observed in blood and urine. After a fairly constant blood level had been established, the drug seemed to be excreted in the milk at a definite concentration per cubic centimeter rather than per total volume. The total amount of sulfanilamide excreted in the milk over a period of five days was never greater than 0.23 Gm., 1.6 per cent of the total dose ingested. The amount of the drug excreted in the milk was so small that there probably would be little danger to the nursing infant unless it was unusually susceptible to sulfanilamide.

Treatment of Gonococcic Vaginitis. — Jacoby and his co-workers treated 108 women who had gonococcic vaginitis with amniotin in capsules containing 1,000 international units of estrogen inserted into the vagina every night. Ninety-two patients were apparently cured. The average time required for cure was 150 days. Relapse occurred in twenty-four patients, on the average in about 109 days. Sixty-eight patients were seemingly cured permanently. Sixteen patients were unaffected and had persistently positive smears throughout the treatment. The vaginal acidity showed great variations in relation to positive smears. The uncertainty of the ultimate results with this treatment indicate the necessity for prolonged follow-up in those apparently cured. The necessity of more intensive efforts to determine when cure is established is obvious.

Inhibition of Lactation.—Cacciarelli used aqueous whole ovarian extract in twenty-five women and anterior pituitary ovarian solution in seventy-five women in whom it was necessary to stop lactation. In the anterior pituitary-ovarian treated group the results were good in seventy, fair in three and ineffective in two. In the ovarian treated group, good results were obtained in seventeen and fair in five; no effect was observed in three cases. It seemed that in the ovarian treated cases the fulness of the breasts was a little more marked. In the anterior pituitary-ovarian patients it was not necessary to give analgesic drugs to stop pain, none of these patients required help in turning because of engorged breasts, the breasts were not as hard and as tense as they were under the old regimen of ice bags and the like, fever was entirely absent, and additional support of the breasts was not necessary. The breasts became full in two women but the freedom from pain was remarkable.

Archives of Internal Medicine, Chicago

64: 1-216 (July) 1939

Haverhill Fever: Report of Case with Review of Literature. E. Farrell, G. H. Lordi and J. Vogel, Brooklyn.—p. 1.
Review of Meningitis Due to Micrococcus Tetragenus: Report of One Case with Bacteriologic Study. T. S. McGowan, Manila, Philippine Islands, and P. Kisner, Fort Leavenworth, Kan.—p. 15.
Experimental Production of Neutropenia with Aminopyrine. E. M. Butt, A. M. Hoffman and S. N. Soll, Los Angeles.—p. 26.
Anatomic Observations on Seventy Hospital Patients After Sudden Death. J. R. Lisa and J. F. Hart, New York.—p. 43.
*Roentgenograms of Chest and Intracutaneous Tuberculin Test for Adults: Comparative Study. L. W. Hunt, Chicago.—p. 49.
Test of Glomerular Function with Sodium Ferrocyanide: Further Studies. E. J. Stieglitz, Garrett Park, Md.—p. 57.
Renal Function and Number of Glomeruli in Human Kidney. J. M. Hayman Jr., J. W. Martin Jr. and M. Miller, Cleveland.—p. 69.
Bacterial Endocarditis: Report of Case in Which Cause Was Actinomyces Bovis. N. Uhr, New York.—p. 84.
Protamine Zinc Insulin: Metabolic Study: Treatment in Two Cases of Severe Diabetes by Equally and Unequally Divided Diets, with Comments on Criteria for Treatment. E. Tolstoi and F. C. Weber Jr., with technical assistance of V. Toscani, New York.—p. 91.
*Total Differential and Absolute Leukocyte Counts and Sedimentation Rates, Determined for Healthy Persons 19 Years of Age and Over. E. E. Osgood, Inez E. Brownlee, Mable W. Osgood, Dorothy M. Ellis and W. Cohen, Portland, Ore.—p. 105.
Limitations of Biopsy of Sternal Marrow. E. V. Kandel and G. V. LeRoy, Chicago.—p. 121.
Metastatic Calcification: Report of Two Cases. D. M. Grayzel and M. Lederer, Brooklyn.—p. 136.
Blood: Review of Literature. C. C. Sturgis, R. Isaacs, S. M. Goldhamer and F. H. Bethell, Ann Arbor, Mich.—p. 148.

Tuberculin Test for Adults.—Hunt correlates the local reactions to the intracutaneous injections of different dilutions of commercial old tuberculin with the x-ray observations in the chests of 460 healthy young adults and forty-five with active lesions. His object is to evaluate the cutaneous reactions in terms of past or present tuberculous infection in the lungs. With 1:1,000, 1:5,000 and 1:10,000 dilutions there was not sufficient correlation between the cutaneous reactions and the x-ray observations worth evaluating. With the 1:100,000 dilution, however, 96.7 per cent of 230 young adults whose roentgenograms were negative gave a negative reaction and 3.3 per cent a positive reaction. With the same dilution,

forty-one of forty-three young adults who had x-ray and other evidence of active tuberculosis gave a positive reaction and two gave a negative reaction. None of the positive reactions in those with active lesions had an area of induration measuring less than 10 by 10 mm. The author considers induration the most important criterion of a positive reaction; erythema alone is unreliable. The quantitative intracutaneous tuberculin test is a valuable aid when used in conjunction with other available data and its accuracy, when properly performed and interpreted, is comparable to that of the commonly accepted immunologic and serologic diagnostic procedures.

Leukocyte Counts.—Osgood and his associates tabulate the results of leukocyte counts and sedimentation rates of healthy men and women from 19 to 30 years of age. As an examination of these tables discloses that there is no significant difference with age or sex within this group, he summarizes the results for the entire group. The figures do not include the extreme range but one that will include about plus or minus three probable errors, or 95 per cent of healthy persons. In other words, if a result in a person of this age group falls outside this range there is less than one chance in twenty that it is normal for that person. These 95 per cent ranges are, per cubic millimeter, leukocytes from 4,000 to 11,000, neutrophil lobocytes from 1,500 to 7,500, neutrophil rhabdocytes from 0 to 200, eosinophil lobocytes from 0 to 400, basophil lobocytes from 0 to 200, lymphocytes from 1,000 to 4,500, monocytes from 0 to 800, disintegrated cells from 0 to 600 and the sedimentation rate in fifteen minutes from 0.5 to 5 and in forty-five minutes from 1 to 30.

Archives of Otolaryngology, Chicago

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Relation of Endocrine Dysfunction to Otolaryngology. C. C. Cody Jr., Houston, Texas.—p. 1.
Role of Septum in Surgery of Nasal Contour. S. Cohen, Philadelphia.—p. 12.
*Otitic Infections Due to Pneumococcus Type III. J. L. Maybaum and J. G. Druss, New York.—p. 21.
Scleroma (Rhinoscleroma): Histologic Changes Following Teleradium Therapy: Review of Scleroma in United States. J. A. Weiss, Chicago.—p. 38.
Labyrinthine Fistulas: Report of Experiments on Vital Response to Various Methods of Producing Defects in Bone. N. Canfield, New Haven, Conn.—p. 50.
Osteoma of Sinuses, the Frontal and Sphenoid Bone: Report of Fifteen Cases. J. H. Childrey, San Francisco.—p. 63.
Mixed Tumors of Salivary Gland Type Seen in Pharynx. C. C. Fox, Philadelphia.—p. 73.
Otolaryngologic Instruments. J. C. Beck, Chicago.—p. 86.
Plastic Surgery, 1938. R. H. Ivy and H. A. Miller, Philadelphia.—p. 99.

Otitic Infections.—Maybaum and Druss point out that it is advisable that the misnomer Streptococcus mucosus be abandoned and the correct term, Pneumococcus type III, be universally adopted. Realizing the importance of the pneumococcus type III infection to otology and the relative scarcity of references to this subject, they reviewed all the cases of pneumococcus type III mastoiditis observed in the otologic service at the Mount Sinai Hospital during the nine years 1929 to 1937. These totaled seventy-three. The clinical course, pathologic changes, diagnosis, treatment and outcome of the cases is presented. Bacteriologic study is of paramount importance, especially in those cases which clinically resemble streptococcic otitis. Extensive destruction throughout the temporal bone is a characteristic observation made at operation or microscopic examination. These changes are frequently encountered in spite of a latent innocuous clinical course. Intracranial complications are associated more commonly with otitic infections due to this organism than with those due to the streptococcus. They usually occur late in the disease and only occasionally in the early stages. Early paracentesis should be done when infection with pneumococcus type III is suspected, to establish a diagnosis, and autogenous vaccine should be used when the organism is identified. All the diseased bony structure should be completely exenterated. Postoperative evidence of petrositis frequently demands early operative intervention combined with the administration of sulfapyridine and serum. There is no specific therapy for pneumococcus type III meningitis. Prolonged observation of the patient after complete healing of the mastoid is of extreme importance.

Archives of Physical Therapy, Chicago

20: 385-464 (July) 1939

*Villous Synovitis of Knees Due to Improper Weight Distribution. W. H. Irish and J. P. Stump, New York.—p. 391.
Physical Therapy of Fractures Managed by Unpadded Casts. L. Kaplan, Philadelphia.—p. 397.
Ultraviolet Irradiation in Corneal Ulcers. E. G. Linn, Des Moines, Iowa.—p. 402
Treatment of Arthritis with Acetyl Beta-Methylcholine Chloride. D. Boyd, S. L. Osborne and D. E. Markson, Chicago.—p. 406.
Colon Disease and Its Therapy in Relation to Chronic Arthritis. E. C. Fishbaugh, Los Angeles.—p. 411.
Rational Colon Therapy. W. W. Worster, San Gabriel, Calif.—p. 417.
Climatotherapy in Upper Respiratory Infection. C. H. Gellenthien, Valmora, N. M.—p. 420.
Treatment of Chronic Cervicitis. W. T. Black, Memphis, Tenn.—p. 427.
Effect of Artificial Fever on Blood Sulfanilamide Level in Rabbits. M. D. Lewis and M. F. Gunderson, Omaha.—p. 432.

Villous Synovitis.—Irish and Stump emphasize the fact that improper distribution of body weight is generally recognized as a cause of painful synovitis of the knee but, like many common conditions, is repeatedly overlooked. In their experience this type of chronic synovitis is a frequent cause of pain and disability. Only brief references to synovitis of the knees due to faulty weight bearing are found in the literature. Mechanical strain causes hypertrophy of the villous formation of the synovial membrane. In patients with weak and distorted feet the weight bearing line is thrown from its center, bringing about abnormal stress on the joint capsule, the muscular supports and the cruciate and particularly the internal lateral ligaments. The close relationship of the cruciate and internal lateral ligaments to the synovial membrane causes that membrane to be constantly irritated by the repeated trauma produced by the strain of weight bearing. This irritation sets up an inflammatory process resulting in hypertrophy of the membrane with proliferation of the villous formation. X-ray examination of the knees often shows no change from the normal, but frequently there is thickening of the soft tissues and haziness of the joint space, the latter suggesting increased density of the synovial membrane. If changes in the osseous structures exist, they are of the hypertrophic or osteo-arthritic type. With hypertrophic changes it is essential to evaluate the probability of osteo-arthritis causing the symptoms and not to consider the patient as having uncomplicated villous synovitis. The authors have long since ceased to operate on this type of knee. Villous synovitis is seen in all body types and at all ages. The definite characteristics are pain, disability, thickening of the knees, articular crepitation, improper distribution of body weight, insufficient osseous x-ray changes to account for the symptoms, and, most striking, return of the knees to normal when the body weight is properly distributed and abnormal mechanical stress and strain are eliminated. The symptoms are insidious and progress over a period of months or years. Not infrequently the patient is conscious of instability and states that the "knees give way" when unguarded walking is attempted, especially after a rest period. Questioning usually elicits other symptoms of foot strain. When the diagnosis of villous synovitis is established, the first consideration is to overcome the strain on the supports of the medial sides of the knees. As these joints are inflamed and painful, the correction must be accomplished by passive treatment, which generally requires the use of foot plates and correct shoes to force the weight away from the inner side of the joints. Constitutional factors are given full consideration. Obesity is corrected. Foci of infection and intestinal stasis are treated. In young persons and mild cases exercise is instituted to increase muscle development and tone. In older persons and advanced cases the motion of the joints required by exercise increases the discomfort. The most characteristic result of treatment after the faulty posture is corrected is subsidence of the subjective symptoms and return of the joints to normal before sufficient time has elapsed for the patient to reduce his weight or have his foci of infection removed. Physical therapy, deep heat, should be used early, as it gives relief of pain and influences the inflamed tissues to return to normal.

Delaware State Medical Journal, Wilmington

11: 153-170 (July) 1939

Blood Stream Infections in Urologic Cases. F. G. Harrison, Philadelphia. —p. 153.
Mitral Stenosis of Rheumatic Origin: Usual and Unusual Features. V. A. Digilio and J. A. Pescatore, Philadelphia.—p. 158.
Common Forms of Heart Disease in Relation to Surgery. F. Hnat, Elizabeth, N. J.—p. 162.

Florida Medical Association Journal, Jacksonville

26: 1-56 (July) 1939

Brain Abscess. J. E. J. King, New York.—p. 13.
The Gallbladder. E. B. Milam, Jacksonville.—p. 21.
Cauterization of Cervix Uteri. S. C. Harvard, Brooksville.—p. 27.
Black Widow Spider Bites. T. W. Griffin, Quincy.—p. 30.
Common Sense Medicine. A. P. Gurganious, Palatka.—p. 32.

Georgia Medical Association Journal, Atlanta

28: 263-306 (July) 1939

Comparative Value of Antisyphilitic Drugs and Problem of Wassermann-Fast Patient. A. B. Cannon, New York.—p. 263.
Low Nodal Paroxysmal Tachycardia: Case Report of Patient Treated with Monopotassium Phosphate. W. R. Crowe, Atlanta.—p. 269.
Simple Apparatus for Continuous Drainage of Spinal Fluid in Meningitis and Other Cerebral Conditions. J. C. Weaver, Atlanta.—p. 273.
Cholecystitis: Indications for Operation. D. C. Elkin, Atlanta.—p. 275.
Work of Federal Food and Drug Administration. T. C. Klumpp, Washington, D. C.—p. 279.
Coronary Occlusion. G. A. Traylor, Augusta.—p. 280.

Indiana State Medical Assn. Journal, Indianapolis

32: 349-402 (July) 1939

Crippled Children's Services. O. W. Greer, Indianapolis.—p. 349.
Admission of Patients to Indiana University Medical Center Under Terms of House Bill 74. J. B. H. Martin, Indianapolis.—p. 351.
Hip Fractures. W. R. Glock, Fort Wayne.—p. 353.
Pin Treatment of Intracapsular Fracture of Femur. F. E. Hagie, Richmond.—p. 356.
The Injured Back. E. B. Mumford and F. C. Reynolds, Indianapolis. —p. 358.
Ophthalmic Treatment in General Practice. H. F. Sudranski, Indianapolis.—p. 363.
*Rabies in Indiana: Survey 1926 to June 1938, with Analysis of Human Deaths. A. W. Ratcliffe, Hammond.—p. 366.
That Acute Belly. C. L. Luckett, Terre Haute.—p. 372.
What Is Nursing? J. K. Hall, Richmond, Va.—p. 375.
Observation and Experiment, Examination and Test, Their Definition and Role in Medicine. W. D. Inlow, Shelbyville.—p. 378.

Rabies in Indiana.—Ratcliffe states that, from 1926 to June 1938, 11,478 animal heads were examined in the state laboratory; of these 6,172 contained Negri bodies. He also points out that 7,659 patients received free antirabic vaccine. Rabies was reported as the cause of death in forty human cases during the period under investigation. Wounds were known to have been present in thirty-four cases and wounds presumably in four. Local treatment is stated to have been given in fifteen cases. This low figure seems to be partially explained by the fact that in many instances the persons wounded failed to consult a physician. This, however, does not account for the fact that of the fifteen patients receiving local treatment only two were treated with nitric acid. Only twelve of the forty patients who died are reported to have received the Pasteur treatment. Of these one received the first Pasteur treatment on the nineteenth day after exposure, died the same day and probably should not be regarded as having been treated. The average number of days lost in the other cases before Pasteur treatment was given was five (variation zero to nineteen). Necropsies were performed in sixteen cases and Negri bodies were demonstrated in fourteen of them. The shortest observed incubation period in a proved case was eighteen days. In some of the unproved cases the incubation periods were still shorter. In the untreated proved cases with the wound above the clavicle the average incubation period was 22.5 days as compared with an average of 39.7 days when the wound was below the clavicle. The average duration of the disease was 4.66 days with no significant difference between the treated and untreated cases. There is need for still further education of the public to the danger of bites from sick or stray animals and the necessity of early prophylactic care at the hands of a physician who is well informed in its application.

Johns Hopkins Hospital Bulletin, Baltimore

65: 1-144 (July) 1939

Plans and Purposes of Johns Hopkins Hospital. J. S. Billings.—p. 7.
Charity and Knowledge. D. C. Gilman.—p. 23.
Johns Hopkins Hospital; Its Past and Its Future. J. B. Herrick, Chicago.—p. 56.
Clinical and Pathologic Features of Carcinoma of Body and Tail of Pancreas. G. L. Duff, Toronto.—p. 69.
Physiologic Study of Movements in Palatal Myoclonus. O. R. Langworthy, Baltimore and R. V. Grimmer, Akron, Ohio.—p. 101.
Studies in Vitamin A: Relation of Vitamin A and Carotene to Serum Lipids. H. W. Josephs, Baltimore.—p. 112.
*Electro-Encephalogram in Healthy Relatives of Epileptics: Constitutional Elements in "Idiopathic Epilepsy." H. Löwenbach, Baltimore.—p. 125.
Factors Influencing Plasma Prothrombin in Newborn Infant: I. Prematurity and Vitamin K. L. M. Hellman and L. B. Shettles, Baltimore.—p. 138.

Electro-Encephalogram of Epilepsy.—Löwenbach made electro-encephalograms of all the relatives of two epileptic patients (two of three siblings) who could be reached easily. His aim was to examine as many members of the same family unit as possible rather than a large general group of relatives of epileptic persons. He was more interested in obtaining a view into the principal facts than in aiming at statistical conclusions. Of the thirty-seven persons without any clinical sign indicating an epileptic disorder, seventeen showed an abnormal electro-encephalogram pattern, i. e., waves which, during rest, were generally irregular, slow and of high and uneven amplitude and which after a few minutes of overventilation showed an increase in amplitude to exceed 200 microvolts and a decrease in frequency to three or four per second. The large slow waves persisted in long runs for a considerable time after the period of hyperpnea. Three of the individuals exhibited outright three per second spike-and-wave groups regarded as pathognomonic of petit mal; one person had spike-and-wave groups of a higher frequency. The question is discussed whether the abnormal features are a symptom of epilepsy which is still not severe enough to take the form of convulsions or whether it is the expression of an inherited functional instability of the central nervous system and, as such, nonspecific. From the observation of a pair of identical twins, one epileptic and one normal, the two having the same type of electro-encephalograms, the author believes that the latter is the case and that some other unknown factors have to be present besides the cerebral dysrhythmia in order to justify the clinical "epilepsy."

Journal of Aviation Medicine, St. Paul

10: 65-112 (June) 1939

Proposed Aid in Selection of Army Flying Cadets. W. A. Carlson, Randolph Field, Texas.—p. 66.
Safety and Comfort Aloft. A. D. Tuttle, Chicago.—p. 72.
Sanitary Precautions on International Airways. W. K. McKittrick.—p. 87.
Concept of Dynamic Accident Potential as Cause for Airplane Disasters. H. B. Porter and D. D. Flickinger, March Field, Calif.—p. 94.
New Policy of Training Naval Flight Surgeons. J. C. Adams, Washington, D. C.—p. 99.

Journal of Bacteriology, Baltimore

37: 583-678 (June) 1939. Partial Index

Evaluation of Germicides by Manometric Method. J. Bronfenbrenner, A. D. Hershey and J. Doubly, St. Louis.—p. 583.
Effect of Aldehydes and Fatty Acids as Added Hydrogen Acceptors on Fermentation of Glucose by Aerobacter Indologenes. M. N. Mickelson and C. H. Werkman, Ames, Iowa.—p. 619.
Evaluation of Group of Germicides by Tissue Culture Technic. A. J. Salle, W. A. McOmie, I. L. Shechmeister and D. C. Foord, Berkeley, Calif.—p. 639.

Journal of Nervous and Mental Disease, New York

90: 1-156 (July) 1939

Specific Motility Psychosis in Negro Alcoholics. S. Parker, Brooklyn, P. Schilder, and H. Wortis, New York.—p. 1.
Juvenile General Paralysis: Report of Case. J. L. Hoffman and A. M. Duval, Washington, D. C.—p. 19.
Tumor of Base of Brain Simulating Aneurysm of Internal Carotid Artery. L. E. Grimberg and D. Arbuse, New York.—p. 22.
Study of Influence of Heterophile Antigen in Nervous and Mental Disease. E. W. Lazell, Northport, N. Y.—p. 31.
Familial Lateral Sclerosis (Spastic Paralysis). G. E. Price, Seattle.—p. 51.

Journal of Nutrition, Philadelphia

18: 1-104 (July) 1939. Partial Index

Chemical and Pathologic Changes in Aging and After Retarded Growth. C. M. McCay, G. H. Ellis, L. L. Barnes, C. A. H. Smith and Gladys Sperling, Ithaca, N. Y.—p. 15.

Utilization of Energy Producing Nutriment and Protein as Affected by Level of Intake of Beef Muscle Protein. E. B. Forbes, A. Black, E. J. Thacker and R. W. Swift, State College, Pa.—p. 47.

Dynamic Effects and Net Energy Values of Protein, Carbohydrate and Fat. E. B. Forbes, J. W. Bratzler, E. J. Thacker and L. F. Marcy, State College, Pa.—p. 57.

Antiacrodynic Properties of Certain Foods. H. A. Schneider, J. Katherine Ascham, Blanche R. Platz and H. Steenbock, Madison, Wis. —p. 99.

Journal of Pediatrics, St. Louis

15: 1-156 (July) 1939. Partial Index

Gastrointestinal Response of Children to Test Meals of Barium and Pasteurized, Evaporated and Base-Exchanged Milks. L. Reynolds, Icie G. Macy and Helen J. Souders, Detroit.—p. 1.

Congenital Syphilis: I. Routine Treatment with Acetarsone of Infants Whose Mothers Were Inadequately Treated During Pregnancy. R. A. Lyon and M. Seymour, Cincinnati.—p. 13.

Id.: II. Comparison of Treatment with Acetarsone and Other Arsenicals. R. A. Lyon and F. C. O'Neil, Cincinnati.—p. 19.

*Supplementary Value of the Banana in Institution Diets: I. Effect on Growth in Height and Weight, Ossification of Carpals and Changes in Franzen Indexes. Lydia J. Roberts, Ruth Blair, Gertrude Austin and Grace Steininger, Chicago.—p. 25.

*Id.: II. Capillary Resistance and Reduced Ascorbic Acid in Blood Plasma. Lydia J. Roberts, Margaret H. Brookes, Ruth Blair, Gertrude Austin and Isabel Noble, Chicago.—p. 43.

Cerebral Vascular Lesions in Newborn Infants and Young Children, with Report of Forty Among 1,000 Necropsied Cases with Spontaneous Vascular Encephalopathy. C. W. Irish, Los Angeles.—p. 64.

Prophylaxis Against Whooping Cough in Exposed Children, with Special Reference to Serum. P. Cohen and J. Lapin, New York.—p. 78.

Treatment of Gonorrheal Vulvovaginitis in Children with Silver Picrate Suppositories. J. W. Holmes, J. A. Jones and N. Gildersleeve, Philadelphia.—p. 86.

Role of Pediatrician in Mental Hygiene. P. H. Jordan, Ann Arbor, Mich.—p. 121.

Effect of Banana Diet on Growth.—Roberts and her associates supplemented the diet of 123 boys from 8 to 16 years of age in an institution with from two to three bananas daily over the period of the school year and they compared the effect on growth and other aspects of physical status with that of a control group consisting of 154 boys. More than 48,000 bananas were consumed during the period of observation, nine months. The bananas were well liked by the boys and were eaten with the same relish at the end as at the beginning of the study. On every basis of comparison the experimental boys had some advantage over the controls: 1. They made a slightly greater mean gain in weight (0.9 pound) and height (0.15 inch) than the controls; a larger percentage of them equaled or exceeded the gains "expected" during the period and their mean percentage gain during the year was significantly greater. 2. In ossification of the bones of the wrist they also showed slightly greater progress. 3. The Franzen measurements showed a similar trend. The boys who had received the supplement made greater mean gains in measurements of arm girth, subcutaneous tissue and weight, and also in the scores for these items. The percentage of experimental boys "selected" as undernourished by these scores, moreover, decreased to a greater extent during the period than did that of the control group. The differences do not in most cases attain statistical significance, but since they were made on matched groups and are consistent in direction they lend support to the belief that the differences are real ones attributable to the supplement in diet.

Banana Diet, Capillary Resistance and Ascorbic Acid.—Roberts and her associates also determined the capillary resistance and the ascorbic acid in the blood plasma of the boys in the banana diet study. The experimental boys averaged 0.2 mg. of ascorbic acid per hundred cubic centimeters of plasma higher than the control boys; this difference is six times its probable error and therefore significant. These results indicate that the allowances for the various dietary essentials for the boys studied should approach the higher rather than the minimal standards which have heretofore been proposed, in particular for vitamin C.

Journal of Pharmacology & Exper. Therap., Baltimore

66: 251-378 (July) 1939. Partial Index

Comparative Study of Stimulant Analeptics Picrotoxin, Metrazol and Coramine. H. W. Werner and A. L. Tatum, Madison, Wis.—p. 260.

*Experimental Comparison of Certain "Skin-Sterilizing" Agents. A. D. Bass, Nashville, Tenn.—p. 279.

Effects of Ingested Lead on Organism: II. Studies on Dog. M. K. Horwitt, Elgin, Ill., and G. R. Cowgill, New Haven, Conn.—p. 289.

*Studies on Excretion of Sulfanilamide by the Digestive Glands. H. M. Carryer and A. C. Ivy, Chicago.—p. 302.

Effect of Benzedrine Sulfate (Beta-Phenylisopropylamine) on Metabolism and Cardiovascular System in Man. K. H. Beyer, Madison, Wis.—p. 318.

Action of Certain Drugs on Respiratory Reflexes. V. E. Henderson and H. V. Rice, Ontario, Canada.—p. 336.

Action of Procaine and Cocaine on Mammalian Skeletal Muscle. D. F. MacGregor, Oxford, England.—p. 350.

Comparative Study in Skin Sterilization.—Bass compared the antiseptic properties of pyridyl mercuric chloride and propyl mercuric chloride with other surgical preoperative disinfectants in common use. Propyl mercuric chloride and mercresin appeared equally effective and at the same time superior to all other compounds studied. Pyridyl mercuric chloride and phenyl mercuric nitrate were somewhat less effective. The largest number of compounds, and those which are most widely employed as preoperative skin disinfectants, fall into a third group which includes iodine, merthiolate, metaphen, mercury bichloride and mercurochrome. Of these, mercurochrome was the least effective. The 7 per cent tincture of iodine gave no evidence of superiority over the 3.5 per cent tincture, and it is quite possible that even weaker concentrations would give equally good results. Of eleven compounds tested, picric acid and mercuric oxycyanide were the least effective. The latter compound showed no advantage over the standard of comparison, 70 per cent ethyl alcohol.

Excretion of Sulfanilamide.—Carryer and Ivy find that sulfanilamide is excreted in the bile, pancreatic juice, gastric juice, succus entericus and saliva of the dog in appreciable quantities. Bacteriostatic levels (from 8 to 12 mg.) may be attained in the hepatic bile. Sulfanilamide appears in the bile with blood levels as low as 1.3 mg. per hundred cubic centimeters. The drug was not definitely toxic to the liver in daily doses of from 0.66 to 1.3 Gm. orally for three days in dogs weighing from 7 to 12 Kg. (15 to 26 pounds). The trend is toward decreased cholic acid and increased pigment output. The concentration of sulfanilamide in pancreatic juice roughly parallels that in the blood but is less than that of the blood. Excretion of sulfanilamide by the pancreas occurs with blood levels as low as 2.1 mg. per hundred cubic centimeters. The highest concentration of sulfanilamide occurred in the gastric juice. The concentration may be as high as 50 mg. per hundred cubic centimeters of gastric juice from four to six hours after the oral administration of 2 Gm. of the drug. Sulfanilamide was found in gastric juice with blood levels as low as 2.2 mg. per hundred cubic centimeters.

Journal of Urology, Baltimore

42: 1-86 (July) 1939

Diagnosis of Perinephric Abscess. G. S. Foulds, Toronto.—p. 1.

Crossed Ectopia of Kidney: Case Report. J. R. Stites and J. A. Bowen, Louisville, Ky.—p. 9.

Pyelitis Cystica Associated with Hemophilus Influenza Infection in Urine. C. E. Burkland and W. F. Leadbetter, Baltimore.—p. 14.

Mycotic Aneurysm of Common Iliac Artery with Rupture Into Right Ureter: Report of Case. W. N. Taylor and H. L. Reinhart, Columbus, Ohio.—p. 21.

Ureteral Transplantations: Experimental Study. L. W. Riba, Chicago. —p. 27.

Primary Carcinoma of Male Urethra. W. N. Wishard Jr. and H. Bodner, Indianapolis.—p. 35.

Rare Type of Prostatic Hyperplasia with Unusual Clinical Observations: Report of Case. G. J. Thompson and H. J. Hammer, Rochester, Minn. —p. 47.

Possible Anatomic Relations Between Pituitary Body and Prostate Gland: II. Pathologic Pituitary Body. H. M. Jones, Rochester, Minn. —p. 50.

Severe Unilateral Hematuria in a Case of Acute Myelogenous Leukemia. B. E. Fillis, Hubbard Woods, Ill.—p. 57.

Does Compensatory Hypertrophy of Adult Human Testis Occur? H. A. Zide, Rochester, Minn.—p. 65.

Some Sequelae of Filariasis of Urologic Interest. P. T. Chen and J. Gray, Shanghai, China.—p. 68.

Use of New Blood Coagulant in Transurethral Prostatic Resection. L. F. Milliken, Philadelphia.—p. 75.

Kansas Medical Society Journal, Topeka

40: 273-316 (July) 1939

Treatment of Congestive Failure. J. Jensen, St. Louis.—p. 273.
Identification and Handling of the Allergic Nose. L. W. Oaks and W. L. Allen, Provo, Utah.—p. 277.
New Semiopen Method for Reducing and Holding Fractures. W. A. Heap, Mulvane.—p. 280.
Rupture of Symphysis Pubis During Spontaneous Labor. C. L. Young, Kansas City.—p. 284.
Why People Go to Cultists. R. P. Knight, Topeka.—p. 285.
Addison's Disease, Report of Unusual Case. F. W. Hall, Halstead.—p. 289.
Bilateral Postoperative Parotitis: Recovery After Sulfanilamide and Roentgen Therapy. M. A. Walker, L. G. Allen, Kansas City, and M. J. Owens, Kansas City, Mo.—p. 291.
Supplementary Measures in Treatment of Pneumonia. C. D. Head Jr., Washington, D. C.—p. 292.

Kentucky Medical Journal, Bowling Green

37: 269-316 (July) 1939

*Chronic Pulmonary Moniliasis. O. A. Beatty, Glasgow.—p. 269.
Surgical Treatment of Massive Hemorrhage from Peptic Ulcer. F. W. Rankin and C. C. Johnston, Lexington.—p. 271.
New Remedies and Old. S. C. Smith, Ashland.—p. 277.
Gonorrhea and Its Complications. M. W. Howard, Harlan.—p. 278.
Hyperpyrexia. R. N. Holbrook, Louisville.—p. 281.
Perinephric Abscess. E. L. Shiflett, Louisville.—p. 282.
Psychiatric Problems Frequently Encountered in Private Practice. W. K. Keller, Louisville.—p. 286.
Emergency Treatment of Automobile Injuries. P. R. Imes, Louisville.—p. 291.
Pathogenesis of Anemia; Classification of Anemias. H. Gordon, Louisville.—p. 297.
Primary Carcinoma of Gallbladder. I. Abell Jr., Louisville.—p. 299.
Multiple Abscess of Liver. G. A. Hendon, Louisville.—p. 301.
Sulfanilamide, Its Effect on Eye, Ear, Nose and Throat. W. R. Pryor, Louisville.—p. 305.

Chronic Pulmonary Moniliasis.—Beatty reports the history of a case of chronic pulmonary mycotic infection due to Monilia albicans. Since the patient lived in Missouri, where sporotrichosis occurs, worked in New Albany sandblasting and gave a history of a blood stream infection which followed hunting, all this was considered in the differential diagnosis. However, the most likely diagnosis was moniliasis. The most prominent symptom is dyspnea on exertion, and probably the next most prominent symptom is frequent hemoptysis. Cough is absent except during a cold. The sputum is serous; the physical changes are sparse compared with the x-ray observations. The x-ray lesion is in both apexes and the most usual location of monilia is in the bases. The patient improved under supportive treatment and iodides. He has been ill six years and, judging the future by the past, he may have several years of comfortable living if he continues to follow his treatment. Because of the marked pulmonary involvement the patient was put to bed as a tuberculous patient would be. He was treated with a streptothrix vaccine for two months, potassium iodide to the point of intolerance, vitamins and iron. He gradually increased in weight and well being. A series of roentgenograms showed a gradual but rather marked change over a period of time. There was much clearing of the inflammatory process. He had a few hemorrhages and temporary setbacks during the course of treatment but these always followed some break in his rest. The diagnosis of pulmonary moniliasis first rests on having the condition in mind. Since it may simulate other conditions of the chest, finding the organism in the sputum is the most valuable criterion for a diagnosis; however, even then secondary invasion of the lungs or bronchi or a primary fungous infection must be eliminated.

Laryngoscope, St. Louis

49: 423-504 (June) 1939

Review of Some of the More Important Contributions to Literature on Neck Infections During Past Ten Years. A. M. Alden, St. Louis.—p. 423.
Otologic Adspice. I. Friesner, New York.—p. 440.
Deep Infections of Neck: (*a*) Applied Anatomy in Deep Infections of Neck. J. M. Loré, New York.—p. 448.
Id.: (*b*) Diagnosis and Treatment of Deep Infections of Neck. H. B. Orton, Newark, N. J.—p. 471.
Id.: (*c*) Nerve Graft Operation for Facial Paralysis. T. G. Tickle, New York.—p. 475.
Id.: (*d*) Plastic Reconstruction in Facial Palsy. C. R. Straatsma, New York.—p. 482.
Rhinoplasty and Rhinopharyngitis. H. C. Comora, New York.—p. 484.
Twelve Varieties of Common Cold. D. C. Jarvis, Barre, Vt.—p. 489.
Bedside Treatment Case. H. M. Goodyear, Cincinnati.—p. 500.

Military Surgeon, Washington, D. C.

85: 1-92 (July) 1939

Discussion of Some Elements of Immunity, with Particular Reference to Results Obtained in Experimental Studies of Strains of Eberthella Typhosa. J. F. Siler.—p. 23.
Malignant Neoplasms of Testis. M. B. Shimkin.—p. 50.
Antiseptics. C. E. Verdier.—p. 59.
Cholecystography. C. G. Lyons.—p. 61.
Visible Tooth Cleaning. H. E. Harvey.—p. 66.
New Banjo Splint. L. Cozen.—p. 67.

New England Journal of Medicine, Boston

221: 1-44 (July 6) 1939

Efficient Psychotherapy for Large Outpatient Clinic. H. I. Harris, Boston.—p. 1.
Results of Sulfanilamide Therapy in Urinary Tract Infections of Pregnancy. G. C. Prather, Boston.—p. 6.
Hematology. W. Dameshek, Boston.—p. 8.

221: 45-84 (July 13) 1939

Alcoholism at the Boston City Hospital: I. Admission of Alcoholic Patients to Haymarket Square Relief Station, with Estimate of Cost of Their Care, 1927-1937. M. Moore and M. Geneva Gray, Boston.—p. 45.
Id.: II. Conditions on Hospitalization of All Alcoholic Patients at Haymarket Square Relief Station, 1923-1938. M. Moore and M. Geneva Gray, Boston.—p. 49.
Id.: III. Conditions on Hospitalization of 344 Patients with Delirium Tremens at Haymarket Square Relief Station, 1923-1938. M. Moore and M. Geneva Gray, Boston.—p. 52.
Id.: IV. Medical and Surgical Complications Among Alcoholic Patients Admitted to Haymarket Square Relief Station, 1923-1938. M. Moore and M. Geneva Gray, Boston.—p. 55.
Id.: V. Causes of Death Among Alcoholic Patients at Haymarket Square Relief Station, 1923-1938. M. Moore and M. Geneva Gray, Boston.—p. 58.
Id.: VI. Estimate of the Intelligence of Alcoholic Patients at Haymarket Square Relief Station, as Related to Chronologic Age, Marital Status and Occupation. L. Trowbridge, M. Moore and M. Geneva Gray, Boston.—p. 59.
Ophthalmology. D. G. Cogan, Boston.—p. 62.

221: 85-122 (July 20) 1939

Massachusetts Medical Society and Socialized Medicine. E. P. Joslin, Boston.—p. 85.
*Knee Injuries in Athletics: Study of End Results. F. S. Hopkins and L. L. Huston, Springfield, Mass.—p. 95.
Sulfanilamide in Treatment of Gonorrhea. A. Jacoby, A. C. Drummond and A. H. Ollswang, New York.—p. 102.
Neurology. J. B. Ayer, Boston.—p. 105.

Knee Injuries in Athletics.—Of a group of 259 major injuries of the knee treated at Springfield College from 1924 to 1937, Hopkins and Huston were able to obtain the end results in 193. This group is unique in that the college trains students to be physical directors of Young Men's Christian Associations, schools and colleges. Accordingly, almost all the subjects reported continued in much more strenuous activity than is generally undertaken by the average college graduate. There was a minimum requirement of one hour of athletic work a day, but the average exceeded eight hours a week. After graduation most of the men coached these sports and frequently took an active part in them. Of the nineteen cases of simple synovitis, 89 per cent and of the fifty-nine with a lateral ligament sprain 81 per cent showed good final results. All were able to continue active athletics. The results of twenty-four semilunar cartilage injuries treated by immobilization (46 per cent good) are sufficiently better than the forty treated merely by bandaging, rest and crutches and given physical therapy (36 per cent good) to warrant the use of a plaster cast as soon as a diagnosis can be made. The results of conservative treatment were so satisfactory, nearly half being good, that the authors believe it should be tried in nearly all cases before operation is resorted to. Of the men who still have disabling symptoms the majority can be cured (66 per cent good results) and all have been sufficiently improved by operation to engage in active athletics. There were twenty-two cases in which there was a questionable injury of the semilunar cartilage; the result was perfect in eight, good in seven and fair in seven. There were twenty-nine patients who underwent operation for the removal of injured menisci. The results were perfect in ten, good in nine and fair in ten. No individual complained of limitation of motion and in the patients examined there was no significant limitation.

New York State Journal of Medicine, New York

39: 1335-1446 (July 15) 1939

Recognition and Treatment of Cardiac Emergencies. E. C. Reifenstein, Syracuse.—p. 1339.
Present Status of Typhoid Carrier Problem. E. C. Hanssen, New York.—p. 1347.
Intussusception. E. Mendelson and R. S. Sherman, Brooklyn.—p. 1353.
Peripheral Vascular Diseases: Prognosis and Indications for Treatment. W. S. Collens and N. D. Wilensky, Brooklyn.—p. 1360.
Head Injuries. J. E. J. King, New York.—p. 1369.
*Amenorrhea and Sterility: X-Ray Treatment with Subsequent Birth of Normal Children. I. I. Kaplan, New York.—p. 1380.
Physical Therapy in Smaller Hospitals: Its Economic Implications. J. A. E. Syracuse, Buffalo.—p. 1387.
Chronic Appendicitis in Children. E. V. Denneen, New York.—p. 1392.
Bromide Intoxication. A. G. Odell, Clifton Springs.—p. 1398.
Kidney Tumors: Some Causes of Poor End Results. E. R. Mintz and E. A. Gaul, Boston.—p. 1405.
Epithelioma of Tonsil: Study of 162 Cases. W. L. Mattick, Buffalo.—p. 1412.
Systemic Manifestations of Lymphogranuloma Venereum, with Illustrative Case Reports. A. B. Gutman, New York.—p. 1420.

Amenorrhea and Sterility. — Kaplan reestablished menstruation in 124 of 142 amenorrheic women. All the women received roentgen therapy to the pelvis; 104 were given additional therapy to the pituitary and in six the thyroid also was treated. The amenorrhea in these women has persisted for from one month to fourteen years and sterility from one to eighteen years. The oldest patient was 45 and the youngest 19 years of age. The data show that, the younger the patient, the more successful the results. Those most successfully treated were within the 21 to 29 year group. There were fifty-two subsequent instances of pregnancy. Of the fifty-two who conceived, seventeen did so more than once. Five women aborted; two of these aborted twice. Forty-four went to term and delivered fifty normal babies, one woman was pregnant, in one woman an ectopic pregnancy developed which was terminated by operation, and one bore an abnormal child. In the group of living children there were twenty-seven boys and twenty-three girls, and reports from their parents have disclosed no abnormalities or physical deformities. Because of the success achieved with irradiation the author reiterates his previous conclusion that irradiation, when properly employed, is not harmful to the mother or to the offspring and that it has proved a valuable therapeutic procedure for the treatment of amenorrhea and the relief of sterility.

Pennsylvania Medical Journal, Harrisburg

42: 1137-1296 (July) 1939

Extraction of Senile Cataract. C. S. O'Brien, Iowa City.—p. 1149.
Use of Silk in General Surgery. D. Guthrie, Sayre, and M. Brown, Davenport, Iowa.—p. 1153.
Neurologic Emergencies. R. Denison, Harrisburg, and J. C. Yaskin, Philadelphia.—p. 1158.
Maternal and Infant Mortality. J. S. Taylor, Altoona.—p. 1163.
Pituitary in Pediatric Practice. T. O. Elterich, Pittsburgh.—p. 1172.
Endocrinology in Childhood: Nature of Obesity in Endocrine Disorders. F. A. Evans, Pittsburgh.—p. 1174.
Puberty in the Female. C. Mazer, Philadelphia.—p. 1176.
Puberty in the Male: Cryptorchidism and Congenital Hypogonadism. J. F. McCahey, Philadelphia.—p. 1179.
Endocrine Therapy in Childhood. C. W. Dunn, Philadelphia.—p. 1181.
Some Endocrine Factors Controlling Growth and Development in Childhood. N. H. Einhorn and L. G. Rowntree, Philadelphia.—p. 1183.
Value of Roentgen Ray Diagnosis in Endocrine Disorders in Childhood. R. S. Bromer, Bryn Mawr.—p. 1186.
*Intelligence of Syphilitic Children. H. H. Perlman and Mildred Willard Gardiner, Philadelphia.—p. 1189.
Sycosis Vulgaris, Its Clinical Manifestations and Treatment. W. D. Whitehead, Scranton.—p. 1193.
Diagnosis and Treatment of Retropharyngeal Abscess. F. H. Rimer, Pittsburgh.—p. 1197.
Feeding in the Second Year. J. M. Lyon, Ardmore.—p. 1199.
Localization of Intracranial Tumors by Insufflation of Air into Ventricular System. F. C. Grant, Philadelphia.—p. 1202.
Diagnosis of Brain Tumors. B. J. Alpers, Philadelphia.—p. 1205.
Peripheral Vascular Disease from Practitioner's Standpoint. J. C. Doane, Philadelphia.—p. 1209.

Intelligence of Syphilitic Children.—Perlman and Gardiner determined the intelligence quotient of fifty congenitally syphilitic children from the outpatient department of the Children's Hospital. Forty-three children were Negro and seven white. The Children's Hospital is located in an area heavily populated with Negroes. The average intelligence quotient for the group was 90.3, classifiable as "average" in intelligence. This average is below the theoretically "perfect" average of 100 which is expected in an unselected group of white children. However, this was not an unselected group, as all the children were drawn from the lowest socio-economic groups. Median ability below the average is to be expected in such a group. In fact, the intelligence quotient of 90.3, which was the average for this group, is probably little if any below what would be "expected." Pintner has stated that the Negro intelligence quotient is below that of the white; it ranges from 83 to 99, with a central tendency around 90. Approximately four years (as an average) had elapsed from the time of birth of the subject until the time when a diagnosis of syphilis was made by means of the blood Wassermann and Kahn reactions. This fact is of importance, as it is frequently claimed that the longer the disease runs untreated, the greater damage it does and the less amenable it is to therapy. While this claim is probably true with regard to visceral syphilis, it probably is not true with regard to its effects on mentality, which apparently fail to develop to the degree that might be expected. In this respect the observations differ from those of von Kiss and Rajka. The results of antisyphilitic therapy in the series were successful. Treatment consisted of the routine use of standard antisyphilitic remedies. The minimal treatment received was for a period of at least one year. The maximal number of years of treatment was ten, with appropriate rest intervals between courses of therapy. The Wassermann and Kahn reactions were completely reversed in thirty-two children and partly reversed in eight. In only six instances was the blood Wassermann fast. Unfortunately, two other children received insufficient treatment, while the parents of two other children refused to have their children treated.

Public Health Reports, Washington, D. C.

54: 1195-1254 (July 7) 1939

Induction of Carditis by Combined Effects of Hyperthyroidism and Infection. M. P. Schultz.—p. 1205.
*Similarity of Australian Q Fever and Disease Caused by an Infectious Agent Isolated from Ticks in Montana. R. E. Dyer.—p. 1229.

Q Fever and Infectious Disease from Ticks. — Dyer presents evidence which indicates that an infectious agent isolated from ticks in Montana is similar to that of Q fever. He summarizes the similar and dissimilar points of the two infections: 1. Q fever has been recognized principally in persons associated with animals, which suggests infection from direct contact with infected animal tissues or with animal parasites. The epidemiology of the Montana infection is unknown, but the presence of the virus in ticks suggests that human infections may be found in rural areas. 2. The one recognized human infection with the Montana virus was very similar to the published descriptions of the Australian Q fever cases. 3. The only point of difference in susceptibility of animals to the two infections is the failure of the American workers to find the monkey susceptible, in contrast to the success in infecting this animal in Australia. 4. Neither disease has been found to produce agglutinins for Proteus X strains. 5. The clinical pictures in guinea pigs, as described in the literature, are similar, with the exception that the Montana infection has been reported to produce a definite local cutaneous reaction following subcutaneous inoculation, while the Australian workers state that no particular local reaction follows such inoculation. In the author's laboratory the Q fever strain produced general reactions in guinea pigs which, although similar to those produced by the Montana virus, were milder. This may be explained by the attenuation of the Q virus during transit to this country. Rickettsiae have not been observed in guinea pigs with Q fever, while they are present in abundance in guinea pigs infected with the Montana virus. 6. Cross immunity tests are identical, with the exception that epidemic typhus and, to a lesser extent, endemic typhus apparently produce more immunity to Q fever than to the Montana virus. 7. In one well controlled test the serum from one recovered case of the Montana infection gave results identical with that from a recovered case of Q fever when tested with a suspension of Rickettsia burneti prepared in Australia. 8. As far as protection tests have been tried, no immunologic difference has been observed between the virus of Q fever and that isolated from Montana ticks.

Rhode Island Medical Journal, Providence

22: 113-132 (July) 1939

The Obvious and the Platitudinous. E. S. Brackett, Providence.—p. 113.
Treatment of Pneumococcic Pneumonia with Sulfapyridine. J. E. Greenstein, Providence, and R. E. Stevens, Rumford.—p. 118.

Southern Medical Journal, Birmingham, Ala.

32: 679-792 (July) 1939. Partial Index

Differential Infection of Mature and Immature Erythrocytes by Plasmodia of Human Malaria. S. F. Kitchen, Tallahassee, Fla.—p. 679.
Review of Recent Research on Drug Prophylaxis and Treatment of Malaria. H. C. Clark, Panama, Republic of Panama.—p. 685.
*What the Life Insurance Companies Think of Malaria. E. C. Faust, New Orleans.—p. 689.
Observations on Five Day Quinine Treatment of Malaria. J. P. Sanders, Caspiana, La., and W. T. Dawson, Galveston, Texas.—p. 693.
Acute Coronary Occlusion with Cardiac Infarction: Some Diagnostic and Prognostic and Therapeutic Suggestions. G. R. Herrmann and G. M. Decherd Jr., Galveston, Texas.—p. 696.
Therapeutic Value of Iodized Oil in Bronchial Asthma: Final Report. L. H. Criep, Pittsburgh.—p. 704.
Radiation Therapy in Ovarian Dysfunctions. F. B. Bogart, Chattanooga, Tenn.—p. 708.
Treating Fractures by Skeletal Fixation of Individual Bone. H. H. Haynes, Clarksburg, W. Va.—p. 720.
Note on Biologic and Clinical Significance of Inherited Variations: I. Types of Scapulas. W. W. Graves, St. Louis.—p. 740.
*Effect of Sinus Disease on the Eye. M. M. Cullom, Nashville, Tenn.—p. 743.
Eye Examinations in Railroad Service. B. G. Dyer, Topeka, Kan.—p. 746.
Functional Nervous Imbalance in Children. H. T. Nesbit, Dallas, Texas.—p. 754.
Some Considerations Concerning Congenital Neuropsychiatric Conditions. R. S. Crispell, Durham, N. C.—p. 757.
Gastrointestinal Manifestations of Pelvic Inflammatory Disease. J. R. Simms Jr. and J. C. Culley, Oxford, Miss.—p. 774.
Significance of Blood Cholesterol Determination. R. L. Sexton, Washington, D. C.—p. 779.

Life Insurance Risks of Malaria.—Faust inquired of three groups of life insurance companies (including eight major organizations doing business in the South and five other companies with negligible Southern business) and finds that in the group of standard insurance risks malaria does not constitute a particular hazard, even though the death rate from malaria in this insured group has been found by one company to be more than eight times as great as in the whole registration area. Some companies do not employ special safeguards, others refuse to write standard policies in certain areas in the South, and still others require an extra premium for persons living in malarious areas or with a history of malaria who are otherwise good risks. The population in the South more commonly affected by malaria belongs to a poorer economic group and the safeguards which the representative life insurance companies set up to prevent excessive loss in substandard groups indicate clearly that they recognize the dangers of the disease in the lower economic strata of the population.

Effect of Sinus Disease on the Eye.—Since there is a paucity of case reports showing an unmistakable connection between sinus operations and the clearing up of ocular disease, Cullom presents six cases which left no doubt in his mind that sinus disease was the cause of the pathologic condition in the eye. Operation on the sinuses cleared up the visual condition. Four cases resembled toxic amblyopias. The patients suffered from marked disturbance of vision. The gradual onset and the progressive failure of useful vision indicated ultimate permanent blindness. In one case there was an inflammatory condition of the vitreous which had been present over a long period. In one case there was clear evidence of pressure on the optic nerve from an unresolved empyema of the sphenoid sinus. In this case vision might have been restored by spontaneous rupture. The great improvement in the general health of these patients is gratifying. They exhibited marked symptoms of toxemia with pallor, loss of weight, strength, appetite and vitality. Five patients had rheumatism. They all regained their color, weight and vigor and were relieved of their rheumatism. While these cases are rare, the author believes that they are more numerous than the few reports indicate. He is of the opinion that every patient with failing vision of obscure origin should receive the benefit of a careful examination of the sinuses, including roentgenograms.

Surgery, St. Louis

6: 1-166 (July) 1939

*Local Implantation of Sulfanilamide in Compound Fractures: Preliminary Report. N. K. Jensen, L. W. Johnsrud and M. C. Nelson, Minneapolis.—p. 1.
Internal Fixation of Trochanteric Fractures of Femur. J. A. Key, St. Louis.—p. 13.
Discoid Cartilage, Trigger Knee. F. R. Ober, Boston.—p. 24.
Pantalar Arthrodesis in Poliomyelitis. F. L. Liebolt, New York.—p. 31.
Pathology and Operative Correction of Finger Deformities Due to Injuries and Contractures of Extensor Digitorum Tendon. E. B. Kaplan, New York.—p. 35.
Dietary Deficiencies in Surgical Patients. R. W. McNealy, J. A. Gubler and Elizabeth H. Tuft, Chicago.—p. 48.
Acute Perforated Duodenal Diverticulum: Case Report. F. K. Boland Jr., Atlanta, Ga.—p. 65.
Primary Acute Epiploitis. E. L. Eliason and J. Johnson, Philadelphia.—p. 68.
Isolated Injury of Mesentery Without Perforation of Abdominal Wall. W. D. Owens and J. M. McClamroch, Miami, Fla.—p. 74.
Rhabdomyosarcoma: Report of Case Presenting Unusual Features, with Reference to Age, Race, Site of Origin and Manner of Growth. H. Y. Harper and J. M. Feder, Anderson, S. C.—p. 76.
Venous Mesenteric Occlusion: Clinical Discussion and Experimental Study. J. K. Donaldson and E. B. Sive, Little Rock, Ark.—p. 80.
Local Lesions Produced in Mice by Staphylococcus Toxin and by Toxin and Nontoxin Producing Strains. R. H. Rigdon, Nashville, Tenn.—p. 91.
Importance of Early Study for Metastases in Tumors of the Bladder: Illustrative Cases. C. E. Burkland, Baltimore, and W. F. Leadbetter, Boston.—p. 98.
Scalenus Anticus Syndrome and Cervical Ribs. F. V. Theis, Chicago.—p. 112.
Simple Technic for Cholecystgastrostomy. M. DeBakey and A. Ochsner, New Orleans.—p. 126.

Sulfanilamide in Compound Fractures.—Because of the bactericidal and bacteriostatic properties of sulfanilamide and as in vitro studies show these properties to be augmented greatly in concentrations higher than could safely be obtained by systemic administration, Jensen and his associates, after complete débridement of compound fractures or dislocations, place from 5 to 15 Gm. of crystalline sulfanilamide in the wound before closure. These wounds are closed tightly by interrupted sutures of silk to the skin only. Closure without tension on the wound is accomplished when necessary by longitudinal splitting of the skin away from the site of the wound but parallel to the closure. Complete reduction is obtained at the time of débridement and absolute immobilization is accomplished by immediate application of unpadded plaster splints held in place by either circular bandage or plaster. Reduction is maintained by continuance, when necessary, of skeletal traction in conjunction with the plaster splints. Casts are not windowed and the wound is left untouched until such time as consolidation of the fracture allows replacement of splints by circular casts prior to ambulatory treatment. The minimum of 000 plain catgut suture material to accomplish hemostasis is buried in these wounds; no attempt is made to suture any deep structures except nerves. To date, the authors have treated thirty-nine compound fractures and two compound dislocations by this method. In two cases, both tibias, one eight days and the other twelve days after reduction, the fractures were recompounded and subsequently became infected. The other thirty-seven healed by primary intention without local or systemic evidence of wound infection. The authors conclude that the local use of sulfanilamide has opened the way for more effective treatment of contaminated wounds. The amount to be used in each specific wound depends on the extent of trauma and contamination, but 20 Gm. is the advisable upper limit in any adult patient. From 5 to 15 Gm. has been found sufficient for average to severe wounds.

West Virginia Medical Journal, Charleston

35: 297-344 (July) 1939

Clinical Variants of Coronary Arteriosclerosis. H. R. Sauder, Wheeling.—p. 297.
Treatment and Management of Nasal Sinus Disease. W. F. Beckner, Huntington.—p. 310.
Diphtheria Immunization Procedures. A. E. Amick, Charleston.—p. 316.
Problem of Tuberculosis in West Virginia. V. L. Kelly, Beckley—p. 318.
Acute and Remote Effects of Injuries to Knee Joint. R. V. Funsten, Charlottesville, Va.—p. 323.
Swimming and Health. D. Ketchum, Huntington.—p. 327.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Heart Journal, London

1: 105-186 (April) 1939

Normal Electrocardiogram. E. N. Chamberlain and J. D. Hay.—p. 105.
Persistent Conduction Defects Following Diphtheria. C. B. Perry.—p. 117.
*Paroxysmal Tachycardia: Etiology and Prognosis of 100 Cases. M. Campbell and G. A. Elliott.—p. 123.
Changes in Chest Lead Electrocardiogram in Coronary Thrombosis. C. Evans.—p. 161.
Traumatic Aneurysm of Left Ventricle. P. T. O'Farrell.—p. 172.
Angina Pectoris Following Crushing Accident. M. Campbell.—p. 177.
Case of Massive Hemopericardium with Recovery After Paracentesis. A. S. Rajasingham.—p. 181.

Paroxysmal Tachycardia.—Campbell and Elliott made a study of the 100 unselected cases of paroxysmal tachycardia that they saw from 1925 to 1932. In forty-two the diagnosis was confirmed by the electrocardiograph, in thirty by observation of an attack and in twenty-eight by the history alone. Of the forty-two attacks with graphic records, eight were ventricular and thirty-four supraventricular. Ventricular paroxysms were uncommon without serious heart disease. There were forty-one cases of heart disease; nineteen rheumatic, two syphilitic, eight hyperpietic and twelve myocardial. There was no heart disease other than the arrhythmia in fifty-nine, though there was a goiter in four of these. The rate was between 140 and 240 in 90 per cent of the cases. Paroxysms were generally of short duration, lasting hours rather than days. In sixty-one the customary duration was less than two hours, and in another twenty-eight twelve hours or less. There were four in which it was about twenty-four hours; in only seven was it longer than this and in eighteen there were attacks lasting more than one day. Long attacks included an undue proportion of the ventricular paroxysms and were more common in cases of myocardial disease. Paroxysmal tachycardia is a symptom rather than a disease. In a minority of cases it accompanies serious heart disease, when, of course, the prognosis is grave. Ventricular paroxysms form a fairly large proportion of this group and are rare otherwise. In most cases paroxysmal tachycardia is not in itself of any grave significance. It is due to reflex causes more often than to any primary change in the cardiac muscle. There is no close association between paroxysmal tachycardia and paroxysmal auricular fibrillation. The prognosis of paroxysmal tachycardia as regards life is excellent unless it is of the rare ventricular type and appears relatively late in life as the first indication of disease of the coronary arteries or unless before the paroxysms have started there is already serious heart disease. Three of the authors' patients lived fifty years after the onset of their paroxysms, another eighteen for more than twenty years and another twenty-six for more than ten years, and most of them are still in good health. There is no constant tendency for the paroxysms to get worse as life advances, and usually some form of treatment can be found which will reduce the frequency and the discomfort produced by the attacks.

British Journal of Dermatology and Syphilis, London

51: 251-300 (June) 1939

Miliary Lymphocytoma or Benign Lymphadenoid Granuloma of Skin: Two Cases. R. Hallam and H. R. Vickers.—p. 251.
Lymphocytoma of Face. F. F. Hellier.—p. 260.
*Desensitization in Treatment of Menstrual Intoxication and Other Allergic Symptoms. J. Géber.—p. 265.
Fatality Following Antisyphilitic Treatment. P. C. P. Ingram.—p. 268.

Desensitization for Cutaneous Menstrual Allergies.—Géber used serum obtained from the patient at the culmination of cutaneous menstrual disorders in the treatment and prophylaxis of these eruptions. Together with these alterations of the skin, general symptoms usually develop: severe, unassuageable headache, nausea, dizziness, lumbago, neuritis, heavy cramps localized to the lower part of the abdomen and pains in the extremities and joints. There is no constant correlation, however, between the intensity of the general and the cutaneous symptoms. The author states that he has demonstrated experimentally that these menstrual disorders are all due to a substance which appears in the organism at menstruation and to which the patient is supersensitive. If he took blood from a patient suffering from menstrual urticaria when the symptoms were culminating he was able to cause urticaria of short duration by reinjecting the serum intravenously. He was not successful, however, in isolating the substance responsible for the allergic conditions. Subsequent experiments showed that the contents of a herpes vesicle produced a herpes eruption if given to the same patient in the menstrual interval. But whereas the menstrual eruption for twenty years always attacked the left buttock, the vesicles produced experimentally appeared on the right buttock. After this artificial eruption had subsided, the woman remained free from menstrual herpes for a year (as long as she was under observation). Thus experimental herpes established in the intermenstruum exerted a desensitizing action. He supposes that the substance that causes the symptoms is present in maximal quantity in the blood stream simultaneously with the acme of the symptoms. Serum taken at this time seems to contain enough specific antigen to accomplish full desensitization. Injections given in the intermenstrual period generally mitigated the symptoms accompanying the following menses. The next series of injections usually brought about full desensitization. Desensitization could never be accomplished by administering serum of another patient, even if she had the same symptoms; thus the antigen proved to be highly specific. Desensitization remained adequate for years in some cases; in others, relapses occurred from two months to one year after treatment. Desensitization proved useful in a few cases of bronchial asthma; the attacks were relieved and did not recur for a long time. Three patients with trigeminal neuralgia, previously treated in vain by various procedures, have been free of symptoms for a long time.

British Journal of Radiology, London

12: 321-384 (June) 1939

*Diffused Skeletal Metastasis in Cancer of Breast. J. F. P. Lamarque.—p. 321.
*Radiosensitivity of Malignant Melanomas. F. Ellis.—p. 327.
Treatment of Superficial Cancer by "X-Ray Caustic" Method. G. J. van der Plaats.—p. 353.
Devices for Maintaining Constant Output of X-Ray Tubes. D. E. Lea.—p. 359.
Review of the International Radiologic Literature for July to December 1938. A. Orley.—p. 364.

12: 385-448 (July) 1939

Radiology of Third and Fourth Ventricles: Part I. E. W. Twining.—p. 385.
X-Rays: Their Influence in Pure and Applied Science. G. Shearer.—p. 419.
Radiography in Zoologic Research. F. C. Fraser.—p. 432.
Biologic Effects of Gamma Irradiation (Series II). S. Russ and G. M. Scott.—p. 440.

Diffused Skeletal Metastasis in Mammary Cancer.—Lamarque discusses the alleviation of pain and the general improvement that occur when skeletal metastasis from cancer of the breast is irradiated locally. He states that even if some metastases prove resistant to the rays the immediate results are good. The general condition of the patient is improved by roentgen therapy: pains diminish or disappear, often evolution may be slowed or stopped for a time, recalcification may take place and a temporary return to normal life may be obtained. But further new lesions always appear, the evolution of which nevertheless remains slower than before. Although the diffuse skeletal metastasis in cancer of the breast is not to be cured, it is possible to obtain some definite improvement by roentgen treatment. Every patient of this group must be systematically submitted to roentgen therapy. That this method of treatment is based either on direct or on secondary action of radiation does not alter this problem. For the present it seems that in many cases total teleroentgen therapy is most logical when the clinical results are considered, as it is difficult to understand how doses too small to kill cancerous cells in a tumor are able to kill them in metastatic locations.

Radiosensitivity of Malignant Melanomas.—Ellis used radium and roentgen therapy in the treatment of thirty-eight cases of malignant melanoma. In twelve of these the therapy was definitely successful in dealing with the lesion treated, in two the success is doubtful, in seven the therapy was considered as having failed, in thirteen the evidence is indefinite, and four were not treated either because the disease was too

advanced or because treatment was refused. The malignant melanoma in the twelve definitely successful cases was situated in the vagina, limbus of the eye, lobe of the ear, upper alveolus, skin near the left ear, right cheek (recurrence), axillary gland metastasis, forearm, vulva, right cheek, glands in the groin and left cheek. This, the author believes, shows that some malignant melanomas are definitely radiosensitive. On the other hand, others have not responded equally well to irradiation, but the causes for the failure might well be something not inherent in the melanoma itself. The factor of general resistance, although it may be important in any individual case, is not, he thinks, of any greater importance than in the case of carcinoma of the lip. Yet no one with any authority suggests that carcinoma of the lip is insensitive to irradiation. The general resistance factor, which is the patient's own "treatment" for any tumor, is probably the most important of all. That there is such a quality is undoubted, but it cannot be accurately defined or estimated, and so its effect in any one case cannot be gaged and thus it does not materially affect this argument. The local resistance, however, is a factor which can be estimated and should be taken into account.

British Medical Journal, London

1: 1165-1216 (June 10) 1939

Psychologic Factor in Chronic Rheumatism. R. G. Gordon.—p. 1165.
Examination of Gastric Contents for Tubercle Bacilli in Adults. G. G. Kayne and A. G. Hounslow.—p. 1170.
Long Delayed Secondary Hemorrhage Following Appendectomy. G. E. Parker.—p. 1174.
Is It Ever Necessary to Kill a Live Baby? B. Solomons.—p. 1175.
Bullous Eruption Due to Sulfanilamide. F. R. Bettley and P. Simon.—p. 1177.
*Observations on Agglutination Test for Weil's Disease. H. C. Brown and J. C. Broom.—p. 1178.

Agglutination Test for Weil's Disease.—Brown and Broom firmly believe that until some method of standardizing cultures of Leptospira is employed the serologic diagnosis of Weil's disease should be undertaken only in laboratories in which the idiosyncrasies of the antigens are well known. Although in principle the agglutination test for Weil's disease is essentially similar to a bacterial agglutination test, difficulties have been encountered which would mask or invalidate the results in the hands of an inexperienced observer. The authors have some reason to believe that cultures which have been quite recently formolized are not agglutinated to so high a titer as those formolized for forty-eight hours or more. From time to time a macroscopic agglutination technic has been advocated, and there is no doubt that when a suitable antigen can be obtained a florid serum will give a positive result after one hour's incubation. The macroscopic method is not nearly as sensitive as the microscopic, and the authors are of the opinion that certain serums of low titer, such as those shortly after the sixth day of disease, may be missed if the macroscopic test is employed.

1: 1217-1268 (June 17) 1939

Psychiatric Experience in the Spanish War. E. Mira.—p. 1217.
*Paranoid Psychosis with Adrenogenital Virilism Successfully Treated by Adrenalectomy. C. Allen in collaboration with L. R. Broster, H. W. C. Vines, Jocelyn Patterson, A. W. Greenwood, G. F. Marrian and G. C. Butler.—p. 1220.
Spinal Anesthesia: Review of Time-Diffusion Method. J. Hughes.—p. 1224.
*Pregnandiol Excretion in Menstrual Cycle. A. M. Hain and E. M. Robertson.—p. 1226.
Treatment of Gonorrhea by Sulfapyridine. J. Sommerville.—p. 1228.
Vaccinial Encephalitis in a Child Aged 14 Weeks. E. Sakoschansky and H. J. Trenchard.—p. 1229.

Adrenalectomy for Paranoid Psychosis with Adrenogenital Virilism.—Allen and his collaborators describe the case of a woman 34 years of age who was suffering from hirsuties and a paranoid schizophrenic psychosis. In view of their previous observations of improvement in sexuality following unilateral adrenalectomy, they performed the operation on this patient. The immediate response to operation was a decided temporary deterioration in the patient's mental condition, but her final return to normal passed through a phase with a direct bearing on sexuality. For this reason the sterone content has been periodically examined, covering altogether a period of ten months, and it has remained below the preoperative level on the color test. The patient's clinical condition has remained satisfactory. This case shows the nature of sexuality and its relation to the functional psychoses, which often coincide with endocrine instability—such as schizophrenia and involutional psychoses. The facts are that sexuality develops along two parallel lines—a somatic and a psychic development.

Pregnandiol Excretion in Menstrual Cycle.—Hain and Robertson correlated the excretion of pregnandiol with endometrial biopsies in five sterile women during the menstrual cycle. No pregnandiol was excreted during the proliferative phase—that is, the early part of the cycle. Pregnandiol excretion was found in all cases in which there was a secretory endometrium. Estimations of the excretion of pregnandiol will reveal, the authors hope, those cases of sterility and other abnormalities in which progesterone therapy is specifically indicated. The specimens of urine covered two consecutive days' output, and assays were made throughout two cycles in four cases and one cycle in the other case. An interval of either two or three days elapsed between the collection of specimens. In no case was pregnandiol found in the urine during the first half of the cycle. The days on which it was recovered in the urine varied from the fifteenth to the thirtieth day of the cycle in the five cases. In only one case was there any divergence between the endometrial biopsy and excretion observations; on the twenty-fourth day a pregnandiol output of 10.5 mg. was associated with an endometrial picture which is not secretory.

Edinburgh Medical Journal

46: 445-508 (July) 1939

Some Ideals and Business of Healing. E. Bramwell.—p. 445.
Chronic Hypertrophic Emphysema: Its Etiology and Cause of Some of Its Signs and Symptoms. R. V. Christie.—p. 463.
Mechanism of Megaloblastic Blood Formation. L. S. P. Davidson.—p. 474.
Mass Attack on Chronic Arthritis. G. L. K. Pringle.—p. 497.

Indian Medical Gazette, Calcutta

74: 257-320 (May) 1939

Treatment of Pneumonia by Sulfapyridine: Report on Fifty Cases with Controls. A. Chand, G. F. Taylor and N. Lall Chitkara.—p. 257.
Clinical Observations on Pneumonia Occurring in a Tea Garden in Assam. S. Chandra Dutta.—p. 260.
Lecithin and Glucose in Treatment of Opium Habit. S. C. Guha Roy.—p. 265.
Simple and Inexpensive Method of Intratracheal Anesthesia. M. C. Ganguli.—p. 266.
Some Experiments on Absorption of Insulin, with Special Reference to Absorption Through Nasal Passages. F. W. Allinson and S. Paul.—p. 267.
Treatment of Acute and Chronic Diarrhea with Salt-Free Diet. H. Salomon.—p. 268.
Injection Method of Treating Enlarged Inguinal Glands in Early Cases of Lymphopathia Venereum (Lymphogranuloma Inguinale). M. Sein.—p. 270.
*Efficacy of Gonadotropic Hormones in Treatment of Whooping Cough. K. Venkatachalam and A. N. Ratnagiriswaran.—p. 271.
Some Anomalies in Morphology of Plasmodium Vivax Occurring in Newborn Baby. B. M. Das Gupta.—p. 273.
*Vitamin C in Pulmonary Tuberculosis. I. Bakhsh and M. Rabbani.—p. 274.
Evolution of Gold Therapy in Phthisis: Part I. S. K. Das.—p. 277.
Ionizable Iron in Certain Indian Foodstuffs and in Students' Dietaries. K. L. Roy, J. C. Pal and B. C. Guha.—p. 281.
Arrhenoblastoma. M. N. Sarkar and B. P. Tribedi.—p. 284.
Simple Means of Preventing Spider Lick. C. Strickland and D. N. Roy.—p. 285.

Gonadotropic Substance for Whooping Cough.—On the ground that whooping cough is a disease that shows a preference for attacking children less than 10 years of age, and old persons occasionally, and that adults are invariably immune to it Venkatachalam and Ratnagiriswaran considered it probable that the power to resist and overcome the disease might be closely associated with the activity of the sex glands, the dominant feature of adult life. Based on this assumption, they used a charcoal adsorbate of the gonadotropic substance of pregnancy urine (orally or parenterally) in the treatment of 136 children. Satisfactory results were obtained in 80.3 per cent of the cases. The most severe symptoms (whooping, vomiting and coughing) were alleviated in about one week. The drug was also found to be effective as a prophylactic, in that it conferred an immunity.

Vitamin C in Pulmonary Tuberculosis.—Bakhsh and Rabbani determined the vitamin C content of the urine of twenty-four tuberculous patients who did not improve on other methods of treatment (bed rest, artificial pneumothorax and the like). Nineteen of these patients had a deficient urinary content of the vitamin. Twenty patients were given daily from 150 to 200 mg. of vitamin C in tablet form by mouth over a period of six weeks. In addition every patient received 500 mg.

of the vitamin daily by intramuscular injection for four days during the first week of treatment. Three patients left the hospital of their own accord during the early part of the treatment, as their condition deteriorated greatly. The appetite of two of the remaining patients was favorably affected. An increase in weight from 1 to 21 pounds (0.5 to 9.5 Kg.) occurred in ten cases. The weight in two cases remained stationary and was less in five. The cough, as reported by the patients, was lessened in eight, in one it was increased and in the remaining eight it was uninfluenced. Expectoration, however, was decreased in only three cases in which the cough was diminished. An increase in the total erythrocyte counts ranging from 100,000 to 3,000,000 cells per cubic millimeter occurred in thirteen patients. The rise in hemoglobin, however, did not parallel the increase in the erythrocytes. In eleven cases the sedimentation rate was appreciably reduced. This favorable effect on the sedimentation rate was parallel with the improvement in cough in most instances but it had no relationship to the changes in the erythrocyte counts. Of the three patients with past histories of hemoptysis it developed again in two during the course of vitamin C treatment. In both patients vitamin C injections failed to control the hemorrhage, one of the patients left the hospital of her own accord and the other responded to artificial pneumothorax. No appreciable anatomic changes were observed in the lungs, as judged by x-ray and clinical examination.

Lancet, London

1: 1303-1362 (June 10) 1939

Left Ventricular Failure. D. E. Bedford.—p. 1303.
Miniature Radiography. B. A. Dormer and K. G. Collender.—p. 1309.
Ether Treatment of Gallstones Impacted in Common Duct. B. O. C. Pribram.—p. 1311.
Experimental Tumorigenesis with Subcutaneous Tablets of Estradiol. A. Lipschütz and L. Vargas.—p. 1313.
*Treatment of Ulcerative Colitis by Cod Liver Oil Retention Enemas. H. Gainsborough.—p. 1319.
*Sulfanilamide in Typhoid Fever. E. H. R. Harries, R. Swyer and N. Thompson.—p. 1321.

Cod Liver Oil Enemas for Ulcerative Colitis.—Gainsborough used cod liver oil retention enemas in the treatment of six patients with ulcerative colitis. The patients were given a high-calory low-residue diet. Retention enemas were generally not started until rest in bed, starch and opium enemas or morphine, if necessary, had reduced the diarrhea and intestinal irritability to a degree that made the retention of the oil possible. The early injections of oil were given during the day; but, when the patient could retain oil for several hours, the injections were given in the evening and were often retained through the night. The initial dose was 2 ounces (60 cc.) and this was increased by 2 ounces at a time to a maximum of 8 ounces (240 cc.) in accordance with the patient's capacity of retention and comfort. When an opaque enema and x-ray study showed that the colon was involved up to the splenic flexure or the transverse colon, the bed was tilted up from the foot for about an hour after the enema was given. The first three patients, in whom the duration of the illness had been six, three and eighteen months respectively, have now been apparently quite well and free from symptoms for two years. The fourth patient, with a twelve year history of colitis, remained well for fifteen months and then stated, in answer to inquiry, that she had relapsed. The fifth patient, with a six year history, remained well but not entirely free from symptoms for fifteen months and then was readmitted for a relapse but since having further treatment has been symptom free for six months. The last patient, with a history of colitis for eighteen months, showed some improvement after treatment; but, since hemorrhage persisted, an ileostomy was performed and the patient died later. The method is by no means curative but shortens the illness in some cases and reduces pain; cod liver oil, compared with other local applications, is tolerated better. The author believes that it is advantageous to continue the treatment two or three times a week for a few months after remission has been established. The patient can be instructed in self administration.

Sulfanilamide for Typhoid.—In the autumn of 1938 the admission of six patients suffering from typhoid provided Harries and his co-workers an opportunity for the therapeutic trial of prontosil (sulfanilamide) and sulfapyridine in the disease. Another patient admitted in 1939 was treated with a combination of sulfapyridine and Felix's Vi serum. With one exception (the last patient) the six cases of typhoid arose as the result of a localized epidemic from a single source. All the patients were adults and were admitted when the disease was well established. The presence of rose spots in every instance indicated that the disease had passed the first week. The attacks were not mild; toxemia ranged from severe to very severe. All the patients recovered. Of the seven patients, five had constipation throughout the attack. Sulfanilamide appeared to be better tolerated than sulfapyridine; the latter, as is well recognized in other conditions, tends to cause nausea and vomiting which, in typhoid especially, are an obvious drawback. The new soluble sodium salt of sulfapyridine may overcome this disadvantage. There is insufficient evidence to draw any conclusions as to the relative therapeutic superiority of the two preparations, but the authors believe that there can be little doubt that sulfanilamide can exercise a bacteriostatic effect on Bacillus typhosus in the blood stream. A typical relapse in the second case, with its commencing step ladder rise of temperature, was unquestionably aborted by sulfapyridine given on the second day of the rise in temperature. Not only was the clinical improvement striking, but also a blood culture, positive on the first day of the relapse, was negative when repeated on the morning of the fifth day after administration of the drug. If it can be confirmed by others that the sulfanilamide drugs will consistently inhibit Bacillus typhosus in the blood, one of the major problems in the therapy of typhoid is on the way to solution. It is suggested that by the inhibition of bacteremia further toxemia is indirectly diminished. It is significant, as tending to support the evidence for the favorable influence of these drugs on bacteremia, that after their administration further crops of rose spots, beyond those present on admission, either did not appear or were sparse. There is evidence that positive urine cultures may become negative within a few days when these drugs are used (two cases), but the authors state that the data are insufficient to enable them to express any opinion about the feces. The most striking result in their series was obtained in the last case from a combination of sulfapyridine and a single intramuscular injection of Felix's serum. The patient entered the stage of convalescence within ten days of admission, although, as a precaution, the drug was continued for a further week. As in other infections for which both chemotherapy and specific serotherapy are available, the authors believe that the most promising treatment of typhoid is likely to be a combination of sulfanilamide and Felix's Vi serum.

Medical Journal of Australia, Sydney

1: 817-850 (June 3) 1939

Management of Inoperable Malignant Disease in General Practice. H. Hamilton.—p. 817.
Radiation Methods in Cancer of Lower Bowel. R. A. Gardner.—p. 829.
Crohn's Disease. J. C. B. Allen.—p. 831.

Practitioner, London

143: 1-128 (July) 1939

Early Diagnosis and Treatment of Cancer. W. Elliot.—p. 1.
Cancer of Stomach. A. G. Anderson.—p. 4.
Cancer of Biliary System. P. T. Crymble.—p. 15.
Cancer of Breast, G. Gordon-Taylor.—p. 21.
Cancer of Lungs and Pleurae. A. T. Edwards.—p. 29.
Cancer of Tongue. S. Cade.—p. 40.
Cancer of Throat. F. C. Ormerod.—p. 49.
Cancer of Rectum. W. B. Gabriel.—p. 63.
Cancer of Genito-Urinary Tract. R. J. Willan.—p. 78.
Cancer of Uterus. Margaret Basden.—p. 91.
Modern Therapeutics: I. Administration of Drugs. A. J. Clark.—p. 100.
Facial Diagnosis. A. Abrahams.—p. 107.
Denture Granuloma. J. C. Ross.—p. 113.

South African Medical Journal, Cape Town

13: 389-420 (June 10) 1939

Medicine and the Public. H. Grant-Whyte.—p. 391.
Clinical Methods in Diagnosis. C. D. Brink.—p. 395.

13: 421-460 (June 24) 1939

Orthodoxy and Unorthodoxy in Medicine. A. Cole.—p. 437.
*Acute Rheumatic Polyarthritis (Rheumatic Fever) in Children. C. F. van der Merwe.—p. 445.

Acute Rheumatic Polyarthritis.—Van der Merwe discusses the differences in the symptomatology of acute rheumatic fever in childhood and in adult life, stressing its insidious onset and the fact that cardiac symptoms can appear before

arthritic changes appear. He recommends large doses of sodium salicylate over a period of at least six weeks. Sodium salicylate is considered a specific antirheumatic drug in opposition to the tendency to assume that rest and symptomatic treatment are equally efficient. It is suggested that rheumatic carditis, which at first offers no hope for the future, can subside to such an extent that the patients become self supporting and relatively normal individuals again. The resulting tachycardia alone is no indication for unlimited rest but should also be treated with digitalis and careful mobilization. Recommending such invalids to the seaside before proper treatment is carried out is scientifically unsound.

Tubercle, London

20: 397-444 (June) 1939

*Treatment of Tuberculosis by Means of Antituberculosis Endotoxoid and Specific Serum. E. Grasset.—p. 397.
Acute or Chronic Tuberculous Lesions as Produced by Colonial Variants of Tubercle Bacilli. K. C. Smithburn.—p. 420.
Observations on "Pericardial Knock." P. W. Edwards and T. Simpson. —p. 426.

Endotoxoid and Specific Serum for Tuberculosis.—Grasset states that it has been found that when tuberculosis endotoxoid (obtained from the tubercle bacillus by an extraction process of repeated freezing at a low temperature and submitted to the detoxicating action of formaldehyde) is injected in doses increasing from 0.05 to 1.5 cc., over a period of several months, it exerts a definite therapeutic action in tuberculous patients. The therapeutic action manifests itself in a variety of tuberculous conditions by a general action which is antitoxic, progressive and durable. There is a fall in temperature and pulse and an increase in weight; toxic phenomena disappear and the general condition of the patient improves. There is a regression of the infection at the site of the lesions, followed by a fibrotic cicatrization and regeneration of the parenchymatous tissue as far as it is physiologically possible. The action is more limited and more delayed in advanced cases. No contraindications have been observed. The results obtained in 242 cases of tuberculosis with tuberculosis endotoxoid, either alone or in conjunction with specific serum treatment, are discussed. There were 220 cases of pleuropulmonary infection; 63 per cent of the Europeans with this infection derived benefit from the treatment. A somewhat lower percentage of the natives were benefited, an occurrence which may be attributed to their higher susceptibility to tuberculous infection. Also patients with laryngeal, urogenital, peritoneal, intestinal, glandular, ocular and osseous tuberculosis were benefited.

Chinese Medical Journal, Peiping

55: 407-506 (May) 1939

Treatment of Burns: Special Reference to Use of Solutions of Silver Nitrate, Aniline Dyes and Their Combination. C. Y. Chen.—p. 407.
Cardiovascular Manifestations of Beriberi. P. T. Kuo.—p. 427.
*Clinical Experiences with Quinine Treatment of Trachoma. S. P. Chang. —p. 439.
Pathologic States Produced by Administration of Posterior Pituitary Pressor Principle. S.-H. Liu.—p. 448.
Some Notes on Malaria in Szechwan. R. L. Crook.—p. 465.
Plague Work in Fukien: V. Rat and Flea Survey of Lungyen, Fukien. Y. N. Yang, E. Landauer, C. K. Koo and P. C. Lin.—p. 479.

Quinine Treatment of Trachoma.—Chang used 10 per cent quinine bisulfate in the treatment of eighty trachomatous patients; twenty were completely cured, twenty-seven almost completely cured, twenty-four showed considerable improvement and nine had no improvement. In general the follicles disappeared earlier than the papillary hypertrophy. On the average the effect of the treatment (by local application) became manifest about two months after the treatment had started. The disease was improved or even cured if the treatment was carried on regularly for six months. A few patients were found to be resistant to quinine, but they responded favorably to alternations of quinine with copper. In a number of cases quinine treatment was found to be definitely more effective than the copper stick, as in them the trachoma was not influenced by the latter but cured by the former. The author believes that, until a more specific therapy for trachoma is discovered, quinine treatment may be considered as the relatively quickest method to cure trachoma.

Journal Belge de Neurol. et de Psychiat., Brussels

39: 295-374 (May) 1939

Study on Mode of Extension and Histopathology of Experimental Trypanosomiasis: II. Meningo-Encephalitis with Trypanosoma Marocanum in Dogs. L. van Bogaert.—p. 295.
Anatomo-Experimental Contribution to Study of Supra-Optic Commissures. M. A. Gerebtzoff.—p. 320.
*Accidents in Course of Metrazol Therapy of Schizophrenic Patients. M. Gross and G. Gross-May.—p. 336.
Polyneuritis Following Treatment with Uliron (Sulfanilamide Preparation). Mme. Radermecker.—p. 349.

Accidents in Metrazol Therapy of Schizophrenia.—Gross and Gross-May differentiate three groups of complications from insulin and metrazol therapy of schizophrenia. They first cite those of a mechanical nature which involve the osseous, tendinous and muscular systems. They show that these complications are explained by the mechanism of the epileptic crisis and the enormous muscular tension which it provokes. The second group of accidents are those involving the vascular system. In this connection the authors cite cases of arrhythmia, irregularities of the pulse, syncope and so on. They themselves observed auricular fibrillation which persisted for four hours. The third group of complications are the pulmonary ones. The authors cite cases of respiratory arrest, pulmonary embolism and pulmonary abscess and say that, according to Ligterink, these accidents can be explained in three different ways: (1) by a thrombophlebitis resulting from intravenous injections (this seems the most probable course) and followed by embolism, (2) by vascular spasms due to the specific action of metrazol and (3) by aspiration during the attack. Further they give a detailed history of a patient in whom they observed severe respiratory disturbances in the course of combined insulin and metrazol therapy. In the conclusion they say that their enthusiasm for the new treatments for schizophrenia is impaired neither by reports of accidents nor by statistics on fatalities occurring in these treatments. Of 2,000 schizophrenic patients, half of whom had been treated with insulin, Malzberg found the mortality to be four times greater in the subjects who had not been treated than in those who had been treated. The authors conclude that they are justified in not letting the risk of death deter them from continuing the metrazol therapy of schizophrenia.

Presse Médicale, Paris

47: 1029-1036 (June 28) 1939

Physiologic Detection of Poison Gas. Cot and Genaud.—p. 1029.
*Value of Testosterone Therapy in Metrorrhagias and Menopausal Disorders. Desmarest and Capitain.—p. 1031.
Disappearance of Hypophysial Diabetes in Fever Attacks. A. Salmon. —p. 1033.

Testosterone in Metrorrhagias and Menopause.—Desmarest and Capitain report the significant results achieved by means of testosterone in the therapy of metrorrhagias, singling out five of their numerous cases for clinical comment. These selected patients were divided into two groups: three young women between 17 and 30 years of age with menstrual and intermenstrual hemorrhages due to a uterine trauma and two women of 50 suffering from menopausal bleeding. The therapy, suggested by unexpected favorable secondary results in the treatment of mastopathies, consisted in medication with 10 mg. of testosterone at varying intervals of time and in decreasing amounts, as determined by the needs, and was not employed until after careful examinations for possible local or general pathogenic conditions. Testosterone therapy, successful as a hemorrhastatic agent, had a remarkable additional effect on the lipodystrophy and ovarian cyst of one of the patients in the first group but did not arrest disorders of the sympathetic nervous system in cases of menopause. In postmenopausal disorders the authors say that they successfully employed a combination of estrogen and testosterone discriminatingly administered in small graduated doses with time spacing, after an investigation in each case of existing dysfunction in ovarian and hypophysial activity. The authors recommend the simplicity and effectiveness of the combined therapies in stabilizing menopausal and postmenopausal stress and strain.

Revue de la Tuberculose, Paris

5: 642-752 (June) 1939

Hematogenic Tuberculosis of the Lung: Evolution, Sequelae and Recidivation. A. Dufourt and J. Bérard.—p. 642.
*Humoral Syndrome of Lipoid Nephrosis in Two Tuberculous Patients in the Course of Chrysotherapy. E. Dalous, P. Valdiguié, J. Fabre and H. Pons.—p. 681.
Sympathetic Manifestations in Phrenicectomy. R. Demarez, L. Devos and J. Vandecasteele.—p. 700.
A Ten Year Experiment with BCG Vaccination in Norrbotten. C. Naeslund.—p. 710.

Humoral Syndrome of Lipoid Nephrosis.—Dalous, Valdiguié, Fabre and Pons present a joint clinical diagnosis, supported in detail by blood, chemical and urine analyses, of two nephropathic patients observed over a period of time. Case 1 is diagnosed as nephritis with an initial stage of a purely nephrotic syndrome, case 2 as a purely lipoid nephrosis. The absence of edemas in both cases, in spite of a significant plasmic hypoproteinemia, induced the authors to reject thyroid therapy in favor of a lipoid-deficient high nitrogen regimen with opotherapy. Complete and definite results were obtained in one case. In the other, treatments were suspended when the symptoms of nephritis replaced the nephrosis syndrome. The authors stress the need of supplementing anatomic with physiopathologic criteria in nephropathic patients who recover but show important modifications. Nephropathies in tuberculous persons may appear as syndromes of lipoid nephrosis revealable only by clinical and humoral tests and having no connection with renal amyloidosis. The characteristic syndrome may be cured and leave no trace or evolve along with amyloidosis and nephritis or be complicated by them. Chrysotherapy was effective in disclosing the clinical and humoral disturbances against the background of tuberculosis.

Monatsschrift für Psychiatrie und Neurologie, Basel

101: 145-208 (June) 1939. Partial Index

Present Status of Cerebral Surgery. G. J. Vlavianos.—p. 145.
*Roentgen Therapy of Traumatic Epilepsy. W. von Wieser.—p. 171.

Roentgen Therapy of Traumatic Epilepsy.—Von Wieser shows that traumatic epilepsy reacts to treatment with roentgen rays in the same manner as do the inflammatory and genuine forms, provided the cerebrum is irradiated by the direct method. If an attempt is made to treat epilepsy by the indirect method, it is necessary to differentiate between irradiations of the sympathetic alone and of the medulla oblongata plus the sympathetic. The first of these two indirect methods of roentgen therapy can be used neither in traumatic or inflammatory nor in old cases of genuine epilepsy, whereas the second one can be used in all types of epilepsy, but, since experiences with the latter method are rather limited as yet, it is not known whether it will produce as satisfactory permanent results as does the direct method of roentgen treatment. Regarding the mode of action of the direct and indirect methods of roentgen therapy of traumatic epilepsy, the author says that the direct method tries to influence the cause of the disease whereas the indirect method aims to reduce the threshold for the stimuli that elicit the attacks.

Archivio Italiano di Urologia, Bologna

16: 127-206 (March-April) 1939. Partial Index

Renal Ptosis: Surgical; Therapy; Caporale's Technic of Nephropexy. G. Squillario.—p. 127.
Metabolism of Oxalic Aid in Surgery on Kidney. M. Fernandez. —p. 166.
*Pneumopyelography in Urinary Calculosis. G. Bravetta.—p. 188.

Pneumopyelography in Urinary Calculosis.—Bravetta discusses the diagnostic value of pneumopyelography in calculosis of the urinary tract. He uses oxygen, which is injected into the kidney pelvis by means of a sterile common piston syringe in doses of from 7 to 15 cc. (unless there is dilatation of the pelvis, in which case a larger amount of oxygen is injected). The existence of a sufficient renal equilibrium is necessary in making pneumopyelography. The procedure is carried out without the administration of any preoperative anesthesia. The patients are kept on a light diet during the previous day. An enema is given just before making pneumopyelography and then a ureteral catheter is introduced up to the pelvis and the retained urine allowed to flow out slowly. Oxygen is injected slowly to prevent sudden pressure. When the patient reports a local feeling of fulness no more oxygen is injected, and without removal of the injecting syringe the roentgenogram is taken. Compression of the abdomen is exerted while the roentgenogram is being taken to prevent interference of intestinal gases with the pneumopyelographic image. The author has obtained satisfactory diagnostic results in many cases, five of which are reported. According to him, pneumopyelography is of value in the diagnosis of calculi of the urinary tract. The procedure has proper indications, namely the diagnosis of radiotransparent calculi of the urinary tract and the verification of the exact location of common urinary calculi, for the selection of the proper operation. It is advisable to resort to the procedure when the clinical symptoms are those of calculi of the urinary tract and the x-ray examination of the tract and pyelography fail to show the calculi (probable presence of radiotransparent calculi). It is also advisable to resort to it when urinary calculi have been shown by roentgenography or pyelography and one wants to ascertain their exact location. The author calls attention to the fact that acute or chronic uremia, fever and hematuria are contraindications to the procedure.

Folia Medica, Naples

25: 625-678 (June 30) 1939. Partial Index

Antalgic Power of Histamine. I. Brignolo and G. Dominicis.—p. 629.
*Action of Vitamin E on Healing of Experimental Wounds on Parenchymatous Organs. E. Bartolomucci.—p. 644.

Action of Vitamin E on Wounds.—Bartolomucci studied the action of vitamin E, administered by mouth, on the healing of experimental wounds of the liver and spleen. He experimented on rabbits and rats which were placed in three different groups as they were fed with a diet rich in vitamin E, a normal diet and a diet which was lacking in vitamin E, after having been wounded. Animals in each group were killed for observation and microscopic study ten, twenty, thirty, forty and fifty days from the beginning of the experiment. The author found that vitamin E administered by mouth accelerates healing of wounds of parenchymal organs, whereas the lack of the vitamin retards the healing process. The retardation is obvious in comparison to that which takes place in the organs of animals on a diet rich in vitamin E and also in comparison to that which takes place in the organs of animals on a normal diet.

Rivista di Patologia Nervosa e Mentale, Florence

53: 171-340 (March-April) 1939. Partial Index

*Extract of Cerebral Substance (Cerebral Antigens) in Diagnosis and Prognosis of Metasyphilis. E. Dossi.—p. 207.
Alterations of Cholesterolemia in Epilepsy: Possible Etiopathogenesis. G. Gomirato.—p. 319.

Cerebral Antigens in Metasyphilis.—Dossi discusses the value of the reaction of deviation of the complement in which cerebral substances are used as antigens for the diagnosis and prognosis of metasyphilis. He performed the reaction in the cerebrospinal fluid of 307 patients who were suffering from syphilis (with or without involvement of the central nervous system), nonsyphilitic diseases and metasyphilis. He used cortical cerebral antigens or else an antigen of ox heart. The cerebral antigens were prepared with the brain cortex of a cadaver of a paralytic patient or else with that of the cadaver of a patient who had no syphilis. The cerebrospinal fluid was examined in the active and inactive stages. The amount of complement which was used was half of that which is used in the Wassermann reaction. The reaction with the cerebral antigens gave constantly negative results in the cerebrospinal fluid of patients who were suffering from nonsyphilitic diseases as well as in syphilis without involvement of the central nervous system. It gave negative results in two cases of cerebral syphilis, in two cases of tabes and in eight cases of dementia paralytica, before treatment in which the reaction with the antigen of ox heart was slightly positive. In the five cases of cerebral syphilis, three of tabes and ninety-five of dementia paralytica in which the reaction was positive for both the cerebral and the ox heart antigen, the positivity of the reaction was less intense for the cerebral antigen than for the ox heart antigen. In fifty-four paralytic patients (twenty-five who improved after the treatment and could be dismissed and

twenty-nine who became worse) the reaction was repeated by the end of the treatment with the following results: It continued to give positive results for both the cerebral and the ox heart antigen in sixteen paralytic patients who improved from the treatment as well as in sixteen who became worse. It became negative for the cerebral antigens and remained positive for the ox heart antigen in seven paralytic patients who improved after the treatment and in eight who became worse. It became negative for both the cerebral and the ox heart antigen in two paralytic patients who improved and in five who became worse. The evolution of paralysis in the eight cases that gave a negative reaction with the cerebral antigen before treatment was rapidly fatal in one case; five patients became worse and two improved so that they could be dismissed in time. The reaction gave negative results for the cerebral and ox heart antigens in the cerebrospinal fluid of four patients who were suffering from dementia paralytica and had had treatment from 1930 on. In these cases the curves of the colloidal tests were normal. The author therefore denies the value of the test for the differential diagnosis of neurosyphilis and metasyphilis and for the prognosis of metasyphilis. He also believes that the disappearance of a positive reaction with the cerebral antigens with persistence of a positive reaction with the ox heart antigen indicates that the latter is more sensitive than the former.

Settimana Medica, Palermo

27: 501-534 (April 27) 1939. Partial Index

Chronic Hepatosplenic Syndrome with Jaundice Treated by Ligation of Splenic Artery. G. Bombi.—p. 501.

*Intrapleural Pneumolysis in Artificial Pneumothorax. F. Speciale.—p. 510.

Pleural Adhesions.—Speciale describes the technic of intrapleural pneumolysis (Jacobaeus's operation) and discusses the main indications and contraindications of the operation. He resorted to the operation in seventy-three cases, including those of unilateral pneumothorax with either a normal contralateral lung (forty-one cases) or else contralateral tuberculosis (thirteen cases) and nineteen cases with bilateral artificial pneumothorax. The adhesions were of different types and thickness in the various cases. They caused direct traction of the parenchyma of the lung and maintained an insufficient pneumothorax in twenty-eight cases, maintained open tuberculous cavities in evolution in forty-one cases and were present in four cases of saccular pneumothorax. The operation gave satisfactory results in forty-nine cases in the group (insufflations could be continued, the sputum became negative for tubercle bacilli and the symptoms and functional disturbances were controlled). The symptoms and functional disturbances either remained unchanged (twelve cases) or had slight favorable modifications (nine cases). Postoperative empyema developed in two cases. It followed a long course to recovery of the patients from proper local treatments. Paralysis of the vocal cord with almost complete aphonia developed in one case. It disappeared spontaneously within a year from compensatory hyperfunction of the contralateral vocal cord. The author concludes that intrapleural pneumolysis is the method of selection for the treatment of pleural adhesions which prevent complete collapse in artificial pneumothorax. The danger of accidents, the development of operative and postoperative complications and the possibilities for the development of infection or for the propagation of tuberculosis are smaller than those from some other operations which are commonly resorted to. The results are satisfactory in a large number of cases. An exact preoperative diagnosis of the origin, size and characters of the adhesions and of the relations of adhesions to neighboring structures is of importance. It is done by radioscopy, x-ray examination of the thorax and pleuroscopy. The best results from the operation are those obtained from progressive section of adhesions which exert traction on restricted zones of the lung. The earlier the operation after verification of the insufficiency of the pneumothorax, the better the results. The operation is indicated in pleural adhesions with insufficient collapse, in the course of an efficient artificial pneumothorax (if the adhesions are amenable to resection) and in the course of elective pneumothorax with persistence of slight functional disturbances. A thorough mastering of the technic is of importance.

Bol. Inst. de Med. Exper. p. Cancer, Buenos Aires

15: 741-984 (Dec.) 1938. Partial Index

*Roentgen Treatment of Keloids. V. del Giudice.—p. 877.

Cancerigenic Cholesterol and Cellular Oscillation. G. Lakhovsky.—p. 889.

Roentgen Treatment of Keloids.—From 1930 up to the present, del Giudice has treated 300 cases of posttraumatic keloids by means of superficial roentgen irradiations (from 90 to 100 kilowatts, with an intensity of 2 milliamperes and administered through an aluminum filter of 2 or 3 mm. at a distance of 20 or 30 cm.). The dose consisted of 200 or 250 roentgens for each irradiation up to a total dose of from 850 to 1,000 roentgens for each series. Early in the treatment pruritus disappears and a transient erythema appears. In the group of patients treated by the author 281 recovered, ten improved and there were nine failures. As a rule the keloid disappears after the first treatment. However, the treatment can be repeated after an interval of two or three months if necessary. A soft flexible skin of normal color and appearance replaces the keloid after treatment. The author concludes that roentgen irradiations are the treatment of choice in posttraumatic keloids. The sooner the treatment is resorted to in the course of the development of keloids, the better the results. The appearance of symptoms of infection in a wound (either surgical or nonsurgical) is an indication for the administration of roentgen irradiation for the prevention of keloids. The preventive roentgen treatment is indicated in infection of wounds, even if they heal by first intention.

Archiv für Gewerbepathologie, Berlin

9: 295-406 (May 16) 1939

*Impairments Caused by Industrial Use of Vanadium: Their Pathogenesis and Symptomatology. Symanski.—p. 295.

Experimental Investigations on Pneumonia in Manganese Workers: Its Relation to Pneumonia Caused by Basic Slag. K. W. Jötten, H. Reploh and G. Hegemann.—p. 314.

Phagocytosis of Dust of Coal and Stone in Vitro. W. Kasten.—p. 337.

Morphologic Changes in Spleen Macrophage Culture After Phagocytosis of Coal and Quartz Dust. W. Kasten.—p. 346.

Dangers to Health in Use of Oils Used for Grinding and Cooling. W. Ehrhardt and W. Gueffroy.—p. 361.

Microscopic Examination of Industrial Dusts by Means of Roentgen Rays. H. Gärtner.—p. 377.

Further Contributions to Roentgenologic Diagnosis of Pulmonary Asbestosis. E. Saupe.—p. 391.

Impairments Caused by Vanadium.—After calling attention to the fact that the use of vanadium has greatly increased in recent years, Symanski reviews the literature on the disorders supposedly caused by it. Reviewing the complicated procedure by which vanadium is produced, he shows that of the various transformation products it is only the vanadium pentoxide, particularly in the readily absorbable form of dust, which is harmful to the health of the workers. He subjected the workers who came in contact with this substance to a careful examination. He describes observations on nineteen men. He found a number of characteristic disorders. He observed conjunctivitis with inflammatory injection of the conjunctivas, suppurating discharge and corresponding complaints such as burning of the eyes, rhinitis with reddishness of the nasal mucosa and coryza with watery discharge, also a feeling of soreness in the pharynx, continuous coughing with more or less profuse expectoration, occasionally sanguineous pharyngeal secretion, a feeling of dryness in the pharynx, sensations of constriction of the chest, occasionally piercing pains, the typical aspects of a more or less severe subacute or chronic bronchitis, considerable sonorous and sibilant rales in the absence of signs indicating inflammatory infiltration of the pulmonary parenchyma, no tuberculous complications but roentgenologic signs indicating a chronic bronchitis. In view of the fact that all examined persons had been active in the production of vanadium for only a few years, the author thinks that it is necessary to consider the possbility of the development of chronic changes. Contrary to reports in the literature, he never observed resorptive gastrointestinal disturbances, renal symptoms, increased nervous sensitivity, disturbances of the central nervous system or impairment of vision. Moreover, he found no characteristic changes in the composition of the white or red blood picture, especially signs of anemia; likewise there were no indications of toxic impairment of the large visceral

glands or of the circulation. Regarding the prevention of the described disorders, he says that all the processes in which vanadic acid is liberated in the form of dust should be mechanized and encapsulated as much as possible. In the mixing rooms, suction apparatus should be installed and suitable masks should be worn by the workers. Moreover, he thinks that the workers could perhaps be rotated, so that they would have days or weeks in which they could recuperate from the effects of the contact with the vanadium.

Deutsches Archiv für klinische Medizin, Berlin

184: 129-248 (June 16) 1939. Partial Index

Congenital Cardiac Effects. G. Schöne.—p. 129.
Silicious Chalk Silicosis. K. Humperdinck.—p. 156.
Insulin Requirements and Diabetic Type. W. Falta.—p. 175.
Rejoinder to Preceding Article. S. Donhoffer and E. Liposits.—p. 179.
Cabot's Ring Bodies. N. Tsamboulas and X. Malikiosis.—p. 183.
*Hypophysial Diabetes. H. Bartelheimer.—p. 185.

Hypophysial Diabetes.—Bartelheimer stresses the importance of recognizing in the hyperfunction of the hypophysis (anterior lobe) a diabetogenic agent. He offers a cursory particularization of the contributions of others to this subject, interspersing some case verifications of his own. Experiments, according to the author, have confirmed the role of the hypophysis in diabetes mellitus, some authors also charging it with the responsibility, along with the adrenal gland, for disturbances in the fat metabolism of diabetic patients. The clinical evidence for the known effects of the hyperfunction of the hypophysis in acromegaly, adiposogenital adenomas and Cushing's syndrome motivated the author's observations of the relative frequency of oligosymptomatic forms of Cushing's disease in diabetic persons. These forms represent all transitions from the almost complete form of Cushing's syndrome to disguised forms difficult of recognition.. In these the author finds the possibility of establishing, through clinical observatons, the connection between diabetes mellitus and the hypophysis and designates a series of symptoms to be studied. One of these symptoms that may secure detection of disguised forms is the frequent occurrence of cutaneous striae. Whenever these appear, the adrenal gland may be involved, as is evidenced by their artificial production in human beings through stimulation of the adrenal gland. Hyperfunction of the basophilic cells of the anterior lobe may be of supreme importance for the clinical comprehension of hypophysial diabetes because of its numerical preponderance. Of the 300 patients in the home for diabetic persons in Garz on the island of Rügen 10 per cent showed clear traits of hypophysial hyperfunction in the direction of Cushing's syndrome, less so of the acromegalic type. According to the author, metabolic behavior is more or less characteristic. Noteworthy are the relatively large supply of glycogen in hypophysial diabetes, a special tendency in some cases to acidosis and glycosuria more independent of carbohydrates than is observable in pancreatic diabetes. The author's therapy consisted in dosing patients showing hypophysial hyperfunction daily with androgens and estrogens for about a week, in observing the metabolism and in noting modifications of the glycosuria and blood sugar content. He cites the treatment of twelve women and eight men with various endocrine preparations and varying results. This short-range therapy did not admit of testing for permanent results.

Folia Haematologica, Leipzig

62: 145-336 (No. 2/3) 1939

Auer's Rods and Qualitative Blood Picture of Auer's Rod Cells (Azurophil Rods) in "Acute Leukemia," Problem of Myeloblasts and of Development of Thrombocytes. J. Arneth.—p. 145.
*Granulocytopenia and Leukemia. G. Voth.—p. 184.
Red Blood Picture of Healthy Girls Between 13 and 20 Years of Age. K. Wedemeyer.—p. 203.
Hematocytology of Thirty Cases of Leishmaniosis Infantum in Greece. A. Botzaris.—p. 215.
Behavior of Bone Marrow of Healthy Persons and Patients When Infected in Vitro. Z. Galinowski.—p. 225.
Two Additonal German Families with Pelger's Nuclear Anomaly. W. Tischendorf.—p. 254.
Erythremia and Myelosis. E. Schwarz.—p. 261.

Granulocytopenia and Leukemia.—Citing the various forms of leukocytosis, Voth shows that some forms are designated as leukemoid leukocytoses or as leukemoid myeloid reactions. If a patient dies during a leukemoid reaction, it may be difficult to determine whether he has a leukemoid reaction or an acute leukemia. Cases have been reported in which a granulocytopenia has changed into a leukemia. The author reviews a number of cases from the literature and shows that they have the following factors in common: (1) the comparatively short duration (a few weeks to six months); (2) acute course of the second (the leukemic) stage; (3) fatal outcome during the second stage. The hemograms during the first stage show a moderate to severe leukopenia in the presence of neutropenia and a more or less severe anemia. The second stage is characterized by anemia and by the typical hemogram of acute myeloblastic leukemia. Similar disease entities are interpreted sometimes as granulocytopenia, sometimes as atypical granulocytopenia and sometimes as aleukemic myeloblastic leukemia. Investigations seem to indicate that in many cases it is impossible to differentiate between granulocytopenia and aleukemic leukemia. In this connection the author points out that the earlier opinion that the peripheral blood picture reflects the condition of the hematopoietic organs is no longer acceptable because it has been proved by intravital examination of the bone marrow that the central hematopoietic organs may show entirely different conditions from the peripheral blood. He shows that disturbances in the bone marrow may involve the maturation, division and elimination of cells. In the conclusion he emphasizes that it becomes increasingly more necessary to dispense with excessive classification in diseases of the blood. As the knowledge about the blood advances, it becomes evident that the blood is extremely sensitive in its reactions and that within these reactions there are many gradations and transitions. Thus it becomes understandable that a disease may be identical with one which formerly was regarded as entirely different. A granulocytopenia and an aleukemic leukemia may represent the same, that is, the first stage of a disturbance of the bone marrow, of which the acute myeloblastic leukemia may be the second stage.

Klinische Wochenschrift, Berlin

18: 765-796 (June 3) 1939. Partial Index

Allergic Manifestations After Physical Exertions. H. Luckner and E. Mann.—p. 767.
Vitamin C Requirements. W. Neuweiler.—p. 769.
Investigations on Antithyrotropic Substances of Blood Serum, Particularly in Patients with Goiter. C. Picado and W. Rotter.—p. 772.
Prevention of Paralysis-like Symptoms in Pigeons Fed with a Sulfanilamide Preparation by Means of Vitamin B_1. W. Engelhardt and H. Hüllstrung.—p. 774.
Cutaneous Capillaries and Fundus Oculi in Shortwave Therapy of Eclampsia and Its Preliminary Stages. H. Mittelstrass.—p. 775.
Significance of Changes in Serum Protein and in Bone Marrow in Venereal Lymphogranuloma. O. Gsell.—p. 778.
*New Simple Flocculation Reaction with Hayem's Solution. W. Gros.—p. 781.

Simple Flocculation Reaction.—According to Gros, Jakobson observed a special kind of serum protein which can be precipitated with Hayem's solution and which occurs in many cases of myeloma. Jakobson also succeeded in isolating the protein fraction that can be precipitated by Hayem's solution, and he demonstrated that it is a special kind of euglobin. Subjection of the body to various precipitation reactions disclosed that it is not identical with Bence Jones protein. Gros detected the special protein body in a woman with multiple myeloma and, since the Takata reaction was likewise strongly positive in this patient, he decided to search for the protein body that can be precipitated with Hayem's solution also in other serums giving a positive or negative Takata reaction. Studies were made on 150 specimens of serum; 100 had been obtained from healthy persons and from patients with mild, nonfebrile disorders, the other fifty from patients with atrophic cirrhosis of the liver, severe parenchymatous icterus and nonhepatic disorders, such as rheumatic polyarthritis, decompensated cardiac defects and malignant tumors. The normal serums all gave a negative Takata reaction, whereas the fifty pathologic serums gave a positive one. Regarding the procedure of the flocculation test with Hayem's solution in normal serums, the author says that he slowly titrated 1 cc. of native serum at room temperature and found that normal serum requires large quantities of Hayem's solution for precipitation in that on the average 2⅔ cc. is required to produce turbidity and 3.02 cc. to produce an irreversible flocculation. In the serums with positive Takata reactions, however, an entirely different behavior was observed.

Serum from patients with myeloma, for instance, already showed a noticeable white precipitate, which, however, proved reversible after the addition of only one drop (0.03 cc.) of Hayem's solution. In the further titration of the serum, every drop produced again a strong flocculation. The addition of 1 cc. produces turbidity, which after the further addition of 0.08 cc. is transformed into irreversible flocculation. In a table the author indicates the behavior of other Takata-positive serums. He emphasizes that the flocculation reaction with Hayem's solution can entirely replace the complicated Takata reaction. It has the advantage that it is much more simple and rapid than the Takata reaction and that it can be performed by the practitioner. The required quantity of reagent is a measure of a greater or lesser positivity of the reaction. The author discusses the diagnostic significance of the intensity of the flocculation reaction for various diseases.

18: 797-836 (June 10) 1939. Partial Index

Etiology of Tumors. F. Kögl.—p. 801.
Hereditary Blood Factor P. P. Dahr.—p. 806.
*Therapeutic Results with Cyren (Stilbestrols) in Ovarian Insufficiency After Pregnancy. H. Tüscher.—p. 808.
Question of Functional Significance of Arteriovenous Anastomoses for Kidney. P. W. Springorum.—p. 811.
Paradoxical Manifestation in Insulin Treatment. S. Lups.—p. 813.
Question of Hormonal Autoproduction of Fetus. H. Winkler and A. Binder.—p. 816.
*Quantitative Consumption of Vitamin C During Fever. Falke.—p. 818.

Stilbestrols in Ovarian Insufficiency.—Tüscher thought it advisable to study the activity of the synthetic estrogenic substances not only in cases in which ovarian insufficiency was brought on by surgical removal or physiologic involution of the ovaries but also in those cases of ovarian insufficiency which appeared in comparatively young women, for instance after a pregnancy. Such women may complain of cessation or of rare or scanty menstruation, of increase in weight, of hot flashes and so on, that is, of signs that are characteristic of the physiologic menopause. Instead of employing the natural female sex hormones, it was decided to employ the stilbestrols, namely the di-ethylstilbestrol dipropionate and the di-ethylstilbestrol di-acetate. In addition to a number of women with ovarian dysfunction of unknown etiology, the author treated eight women with secondary amenorrhea or hypomenorrhea after pregnancy. After relating the clinical histories of several of these patients, he says that the exclusive administration of stilbestrol may bring on the menstrual flow and regulate the cycle. In cases in which the administration of the stilbestrol did not induce menstruation or in which the effect was only temporary, corpus luteum hormone was given. The dose of stilbestrol was not increased, in order to avoid excessive doses and undesirable effects such as vomiting. The author advises that treatment be initiated during the proliferative phase with 1 cc. (0.5 mg.) of the di-ethylstilbestrol dipropionate or with 1 cc. (0.75 mg.) of di-ethylstilbestrol di-acetate. This dose is given every second or third day for a period of two weeks. If there is no result or if the menstruation is weak, the same series of treatments can be repeated two or three times, if necessary, with the aid of the corpus luteum hormone during the second half of the intermenstrual period. As stated before, the author advises against an increase in the individual dose of stilbestrol. He concludes that the results that are obtained with the stilbestrols indicate that although they differ from the natural female sex hormones in chemical structure they nevertheless exert the same biologic action. They are well tolerated when given in correct doses.

Consumption of Vitamin C During Fever.—Falke says that in patients with febrile diseases the tolerance test always reveals a higher deficit than corresponds to the ascorbic acid content of the blood. In order to determine the quantity by which the consumption of vitamin C is increased during fever, he determined the vitamin C balance in patients who were subjected to fever therapy on account of arthritis deformans. The fever therapy was begun after it had been determined what was the relationship of intake and elimination during saturation and in the absence of fever. By determining the elimination of vitamin C during the administration of 300 mg. and by comparing the quantities in the absence and presence of fever, it was found that the consumption is about 100 mg. higher on days on which the patient has fever than on other days. An attempt also was made to prevent a reduction of the elimination of vitamin C during fever by giving larger doses of ascorbic acid. When this was done, it was found that the increased consumption amounted to 300 mg. When this test method is used, however, a considerable disturbance is produced by the fact that the daily consumption is influenced by the quantity that is administered. In all, observations were made on fifty-eight days with fever and on seventy-two days without fever. The number of patients was fifteen.

Münchener medizinische Wochenschrift, Munich

86: 951-988 (June 23) 1939. Partial Index

Diagnosis of Cholangitis. R. Mancke and W. Siede.—p. 951.
Differential Diagnosis of Postdiphtheric Paralyses. G. Jacoby.—p. 953.
B_1 and C Vitamin Therapy in Vomiting. J. Kupas.—p. 957.
*Extra-Uterine Endometriosis. F. von Mikulicz-Radecki.—p. 962.
Clinical Picture of Necrosis of Pancreas. D. Forstmann.—p. 968.

Extra-Uterine Endometriosis.—Von Mikulicz-Radecki presents a clear and concise review of the important features in the study of uterine and extra-uterine endometriosis and their interrelations. His report is based on eighty-eight cases of endometriosis, seven cases extra uterine, discovered in 2,283 patients on whom gynecologic surgery (exceptions noted) was performed during the course of seven years of clinical observation. In his analysis of the site of the disease the author includes 884 cases reported by the Mayo Clinic (Counseller) in 1938 and 104 reported by Cattell in 1937. Of the entire number (1,076) ninety-one were cases of extra-uterine endometriosis, with recto-uterine (thirty-five) and rectosigmoid (thirty-nine) preponderating. The remaining cases (seventeen) were those of the appendix (six), bladder (four), navel (six) and on abdominal scars (one). Interweaving selected cases of his own into the discussion of the symptomatology and diagnosis of extra-uterine endometriosis, the author points out, together with other important symptoms and observations, that the presence of bluish cysts (in their origin enlarged endometrioid glands with extravasated menstrual blood) constitutes a true diagnostic criterion of the disease. He advises frequent proctoscopies and exploratory excision for discriminating between endometriosis and rectal carcinoma, for which the disease has been mistaken in the past. No uniform therapy is possible in recto-uterine endometriosis. The author stresses the fact that many patients require neither surgery nor roentgen rays but merely to be kept under clinical observation. However, when these forms of treatment are resorted to, discrimination should be made, with due consideration of the age of the patients. Recto-uterine endometriosis in pregnancies is variable: proliferation may increase or decrease or remain stationary. Surgical intervention in a patient with endometriosis caused by a previous gynecologic laparotomy and in another patient with endometriosis of the ovaries was completely successful. According to the author, carcinomatous evolution of endometriosis is rare (only five authenticated cases in the literature). A uniform etiology for all forms of endometriosis is not yet recognizable. Extraperitoneal endometriosis is of sufficiently frequent occurrence to challenge attention.

Zeitschrift für Immunitätsforschung, Jena

95: 345-534 (June 8) 1939. Partial Index

Studies on X-Lysin, a Thermostabile Bacteriolysin That Develops Under Certain Bacteriologic Conditions. P. Hjorth.—p. 360.
Infectious Mechanism of Anthrax Bacilli, Especially of Their Spores. K. Aoki and K. Yamamoto.—p. 374.
Question of Diagnostic Utilization of Hanganatziu-Deicher's Reaction. K. Mellenthin.—p. 381.
*Demonstration of Toxin Resembling Dick Toxin in Filtrates of Various Bacterial Cultures. R.-E. Bader.—p. 426.
Experiences with Pallida Reaction (According to Gaehtgens): Diagnostic and Therapeutic Significance. L. Schleif.—p. 431.
Problem of Active-Passive Immunization Against Diphtheria. E. Schmid.—p. 486.

Toxin Resembling Dick Toxin in Bacterial Filtrates.—Bader cites reports from the literature which indicate that there are strains of staphylococci that are capable of eliciting a cutaneous reaction, which can be inhibited by the administration of scarlet fever serum; that is, staphylococci produce a toxin which resembles Dick toxin in its effect on the human skin. The question arose whether this characteristic of staph-

ylococci exists also in other bacteria. In order to determine this the author prepared culture filtrates from thirty-two bacterial strains that had been isolated from different disease processes. There were nine strains of Staphylococcus albus anhaemolyticus, eight of pneumococci of various types, five of Bacillus pyocyaneus, eight of Bacillus proteus vulgaris and two of meningococci. The author realized that testing the filtrates for the production of substances resembling Dick toxin was possible only by means of the neutralization test with scarlet fever serum, because the similarity of the majority of cutaneous reactions does not permit the drawing of conclusions from these alone. He succeeded in neutralizing the action of four culture filtrates (one Staphylococcus albus anhaemolyticus, one pneumococcus type I, one pneumococcus mucosus, one proteus) by means of scarlet fever antiserum, whereas the neutralization with the diphtheria serum, which was used for control purposes, did not succeed. From these results he concludes that there are a number of pathogenic micro-organisms which, irrespective of the disease process from which they are derived, produce a toxin that exerts a cutaneous action similar to the Dick toxin, although they have no connection with scarlet fever. He further decided to isolate various bacterial strains from scarlet fever patients and to subject the culture filtrates of these to the same neutralization experiment on the human skin. Of the culture filtrates of ten micro-organisms, which were obtained from the nasopharynx of seven patients with scarlet fever, eight could be neutralized. The author concludes that it must be assumed that there are a number of bacteria which produce toxins resembling Dick toxin in their cutaneous action. This characteristic is especially frequent in the micro-organisms that are obtained from scarlet fever patients.

Zeitschrift für Orthopädie, Stuttgart

69: 257-376 (May 30) 1939. Partial Index

*Aspects of Multiple Hereditary Disturbance of Ossification of Epiphyses. W. Müller.—p. 257.
Lumbosacral Pains and Sciatica. R. Kienböck.—p. 282.
Dislocation of Hip Combined With Other Deformities in Their Significance for Problem of Dislocation of Hip. W. Müller.—p. 293.
Treatment of Coxa Vara Adolescentium by Means of Breaking Epiphyses. O. Stracker.—p. 327.
Changes in Length of Feet in Insufficiency of Feet: Measurement, Etiology and Diagnostic Evaluation. E. Uebel.—p. 339.
Surgical Treatment of Second Köhler's Disease on Head of Os Metatarsale. M. Brandes and E. Ruschenburg.—p. 353.

Multiple Hereditary Disturbance of Ossification of Epiphyses.—Müller thinks that the time has come when all such terms as coxa vara adducta chondrodystrophica (Freund), atypical chondrodystrophy (Jansen), chondro-osteodystrophy (Brailsford), achondroplasia atypica (Wahren), chondrodystrophia congenita tarda (Schorr), osteochondro-arthrosis (Weiss) and hereditary multiple epiphysial disturbance (Ribbing) should be defined as a uniform type. The many reports indicate that this articular disturbance is not at all rare. Nevertheless the author thinks that its mild forms are often overlooked, for their roentgenologic aspects may easily be mistaken for the terminal stages of other articular disorders. The chief aid in the recognition and observation of the multiple hereditary defect in the ossification of the epiphyses is the x-ray examination. On the basis of a large number of his own observations and of many reports in the literature, the author discusses the clinical aspects of this entity as they become manifest on the large joints, particularly the hip, knee, shoulder and elbow. He shows that there are gradations, from the severest deformity of the entire skeletal system to mild changes on the joints, which present the aspects of an osteochondritis dissecans. He is convinced that close connections exist between hereditary multiple disturbances of the epiphysial ossification and the multiple forms of osteochondritis dissecans; he thinks that the two represent only gradual differences or different stages of the same disorder. He regards the term "familial multiple disturbance of epiphysial ossification" as the most suitable term and emphasizes that the hereditary or familial appearance is one of the most characteristic aspects of this disorder. The mild forms of this disorder deserve attention, because their true nature and particularly their hereditary character are frequently overlooked.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

79: 1409-1472 (June 6) 1939. Partial Index

*Parinaud's Oculoglandular Syndrome and Venereal Lymphogranuloma. A. J. Ouwejan.—p. 1410.
Manner of Transmission of Syphilis to Fetus. Loe Ping Kian.—p. 1430.

Oculoglandular Syndrome and Venereal Lymphogranuloma.—Ouwejan points out that in 1889 Parinaud described an infectious conjunctivitis of animal origin which Gifford in 1898 designated as Parinaud's conjunctivitis. It is characterized by a severe conjunctivitis and by involvement of the preauricular and submandibular lymph nodes. The author shows that the term oculoglandular syndrome or conjunctivoglandular syndrome is to be preferred to Parinaud's conjunctivitis. In the course of the years it became evident that the disorder is not a disease *sui generis* but that the syndrome may occur in different diseases. The author reports three cases of Parinaud's oculoglandular syndrome in which the virus of venereal lymphogranuloma was probably the cause. To be sure, it was not possible to demonstrate the virus in the pus from the eye or in the conjunctival tissue but the Frei test was positive in two cases and venereal lymphogranuloma had previously occurred in the third. The author admits that the Frei test may produce nonspecific reactions and that the aforementioned cases may belong to this group. However, the literature reports cases in which Parinaud's oculoglandular syndrome was caused by the virus of venereal lymphogranuloma and the author thinks that this possibility exists also in the cases described here. The aim of this report is to direct attention to this possible causal connection between venereal lymphogranuloma and Parinaud's oculoglandular syndrome. The recognition of this connection is of therapeutic significance, because by means of fuadin (sodium antimony biscatecholdisulfonate of sodium) and sulfanilamide venereal lymphogranuloma can now be cured more rapidly than formerly.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

83: 2713-2812 (June 10) 1939. Partial Index

*Treatment of Cutaneous Pruritus with Insulin Together with Some Theoretical Considerations. C. G. Vervloet.—p. 2728.
Fibrillary Chorea of Kny-Morvan a Diencephalosis. J. J. H. M. Klessens.—p. 2733.
Neurologic and Psychiatric Onset of Tumors of Lung. A. M. Meerloo.—p. 2740.
*Does Bovine Type of Tubercle Bacillus Produce an Independent Disease Entity in Human Subjects? C. J. Huët.—p. 2744.

Insulin in Treatment of Cutaneous Pruritus.—Reviewing the literature on the treatment of cutaneous pruritus, Vervloet cites among others von Noorden, who was able to counteract by means of insulin general pruritus of nondiabetic origin which had proved refractory to other treatments. Vervloet himself observed that in several patients with hepatic disease, in whom insulin produced good results, cutaneous itching disappeared largely or entirely. He reviews the clinical histories of several of these patients and says that twice 10 units or twice 15 units, to which sugar was added, was usually sufficient. He thinks that the therapeutic effects produced by insulin in several forms of cutaneous pruritus are probably due to the correction of the intracellular metabolism in the liver and the kidneys. He shows further that this medication deserves recommendation in pruritus of pregnancy and in other forms of cutaneous pruritus.

Does Bovine Tubercle Bacillus Produce a Special Disease Entity?—Huët points out that it has been said that the bovine tubercle bacillus produces less dangerous forms of tuberculosis than does the human type. On the other hand, it has been said that the bovine bacillus has an especial predisposition for certain organs, such as the lymph nodes and the bone system, and that it has an especial tendency to generalization. The author describes his observations on nineteen children in whom bovine bacilli were detected and then reviews Tobiesen's observations in twenty-six cases of bovine tuberculosis, six of which were fatal. Further he discusses the incidence of bovine infection observed by various other investigators and he reaches the conclusion that it is not probable that the bovine type of the tubercle bacillus as such is less virulent than the human type. He thinks that the route of infection is responsible for the fact that bovine tuberculosis is generally more benign than is the tuberculosis that is caused by the human type. The latter type of bacilli invade the most

vulnerable organ, the lung. In bovine infection, however, the different route of invasion leads to the involvement of other organs, which have a better prognosis for overcoming the tuberculous infection. It remains unproved that the bovine bacillus has a special tendency for metastatic forms of tuberculosis. Figures which seem to favor this assumption can be explained by the selection of the material.

Acta Obstet. et Gynec. Scandinavica, Stockholm

19: 113-246 (No. 2) 1939

Experimental Investigations on the Muscular Functions of the Vagina and the Uterus in the Rat. S. Genell.—p. 113.
Positive Friedman Reaction in a Case of Corpus Luteum Cyst. B. Heiberg.—p. 176.
Quantitative Determination of Gonadotropic Hormone Content of Urine Following Removal of Hydatid Mole. M. Winge.—p. 186.
*Employment of Sulfanilamide in Infections of the Urinary Tract During Puerperium. E. Brandstrup and V. Sindbjerg-Hansen.—p. 195.
*Some Points of View on Emesis Gravidarum. P. Wetterdal.—p. 201.
Effect of Gonadotropic Substance in Cases of Amenorrhea: Production of True Menstruation and Increased Excretion of Estrogen. E. Rydberg and E. Østergaard.—p. 222.

Sulfanilamide in Urinary Infections. — Brandstrup and Sindbjerg-Hansen report experiences with chemotherapy in infections of the urinary tract in puerperal women. The authors observed pyelitis in about 1.5 per cent of the puerperal women and pyuria in approximately 10 per cent. Pyelol (a calcium chloride phenyl salicylate preparation) was employed by the authors for many years and in the spring of 1937 they began treatment with sulfanilamide. They compare the results which they obtained in 439 cases treated with pyelol and 120 treated with sulfanilamide. The patients who were treated with sulfanilamide were given two tablets three times a day for four days. With this dose the urine became free from bacteria in 73 per cent of the cases. In some of the remaining 27 per cent of cases the treatment with sulfanilamide was continued for another four days and in this manner the percentage of recovery was raised to 88. Treatment with pyelol made the urine free from bacteria in 51 per cent of the cases. Thus the results obtained with sulfanilamide were far superior to those obtained with pyelol. Moreover, the treatment with sulfanilamide is brief, inexpensive and convenient; it requires no restriction of the diet or of the water intake. No dangerous complications were observed by the authors, but since the literature reports cases in which undesirable secondary effects resulted from the same dosage as that employed here, it is necessary to keep the patients under observation for the duration of the treatment.

Emesis Gravidarum.—Wetterdal says that investigations on 7,000 pregnant women revealed severe emesis in 12.7 per cent, moderate emesis in 31.1 per cent and slight emesis in 22.5 per cent, the remaining 33.7 per cent being entirely free from emesis. Of the women under 20 years of age, 62.2 per cent were free from emesis. In the other age groups the distribution of cases of emesis was uniform. It was observed also that emesis occurs as frequently in primiparous as in multiparous women. The author examined the cholesterol content of the blood serum in 311 persons, fifteen of whom were not pregnant. The average value was 247.9 ± 0.33 mg. per hundred cubic centimeters. In the 206 pregnant women who had emesis the average value was 210.1 ± 0.13 mg. per hundred cubic centimeters, whereas in the ninety pregnant women in whom emesis was absent the average was 238.6 ± 0.15 mg. per hundred cubic centimeters. Thus pregnant women with emesis have a lower cholesterol content than have those without emesis and it seems that hypocholesteremia is one of the symptoms or one of the causes in many cases of emesis gravidarum. The author points out that attempts have been made to counteract the hypocholesteremia by the administration of cholesterol and various other biliary components. He decided to use a preparation with which several investigators had obtained favorable results, and fifty tablets of which contain 2.76 Gm. of glycocoll tetracetate, 4.83 Gm. of extract of ox bile, 0.23 Gm. of cerium isovalerianicum, 2.3 Gm. of sodium bicarbonate and 2.3 Gm. of calcium carbonate. A fluid preparation of similar composition is employed for intramuscular injection. The author administered the preparation mostly in the form of tablets, two tablets being given three times a day. In a number of cases in which this treatment failed to have the desired effect the fluid preparation was administered. More than four injections were seldom given but the author gained the impression that more injections would have produced better results. Among the cases of emesis tested for cholesterol and treated with the preparation, the results are known in 104 cases. In sixty-seven, approximately two thirds of these, the treatment was successful. These sixty-seven patients had a low cholesterol content, whereas the thirty-seven in whom the treatment was a failure had a relatively high cholesterol content. This seems to prove that treatment is less effective when the cholesterol values are relatively high.

Nordisk Medicin, Helsingfors

2: 1643-1722 (June 3) 1939

Hospitalstidende

*Preoperative and Postoperative Fluid Treatment in Patients with Pyloric Stenosis. J. Clausen and A. Ringsted.—p. 1649.
After-Examination of Supracondylar Fracture of Humerus in Children. U. Hansen.—p. 1661.
Quantitative Determination of Sulfanilamides. Margrethe Hejde Simesen. —p. 1663.
Treatment of Acute Suppurative Otitis in Scarlet Fever with Streptamide Irrigation. (Preliminary Report.) Eva Møller.—p. 1665.

Fluids for Patients with Pyloric Stenosis.—Clausen and Ringsted state that in pyloric obstruction with marked dehydration and chloropenia there is sometimes a reduction of the kidney function. Administration of a considerable amount of sodium chloride and fluid is often required for complete rehydration. It may be impossible by clinical examination alone to estimate accurately the degree of dehydration. Examination of the diuresis or serum chloride or urine chloride alone, or determination of the chloride balance, affords no certain indication of the state of hydration. It is best estimated by determination of the serum chloride concentration and the twenty-four hour urine chloride. In patients greatly undernourished and dehydrated because of long continued obstruction these determinations must be supplemented by analysis of the plasma protein before rehydration with saline solution, in order to avoid the possible development of a hypoproteinemic edema. In cases of hypoproteinemia one or more blood transfusions are advised in the preoperative treatment to raise the serum protein concentration and make rehydration possible. The authors believe that when in pyloric stenosis the obstruction is almost complete at least 100 Gm. of dextrose should also be given daily, at all events during the last two days before operation, either as a 5 per cent solution of dextrose or by the addition of 5 per cent dextrose to the salt solution. Generally speaking, isotonic dextrose solution should be given after the operation to compensate for the physiologic fluid loss, and isotonic salt solution to replace the nonphysiologic fluid losses and, if the patient was not rehydrated before operation, to continue rehydration, under control of serum and urine chloride and serum protein.

Norsk Magasin for Lægevidenskapen

*Nosography and Diagnosis of Boeck's Sarcoid. H. J. Ustvedt.—p. 1677.

Nosography and Diagnosis of Boeck's Sarcoid.—Twelve cases with the probable diagnosis of Boeck's sarcoid are discussed. In two cases there was renal involvement as described by Salvesen (scanty albuminuria, considerably reduced function, normal blood pressure). Cutaneous changes were present in only two cases. Ustvedt stresses that pulmonary changes, especially bilateral hilus adenitis, seem to dominate the picture. Pulmonary changes appeared in eleven of his cases, bilateral hilus adenitis in nine. He says that in bilateral hilus adenitis where careful examination excludes tuberculosis, malignant granulomatosis, cancer and leukemia, Boeck's sarcoid should be borne in mind. Of the diagnostic criteria in Boeck's sarcoid (exanthem, histologic picture, tonsil biopsy, tuberculin energy, hyperproteinemia, other blood changes, cystic osteitis) none can be considered absolutely certain. Diagnosis can be made only on the complex of manifestations from skin, eyes, bones, glands and lungs, and the greater the combination of phenomena, the more certain the diagnosis. The differential diagnosis between Boeck's sarcoid and typical tuberculosis is usually the most difficult. Many cases of so-called chronic miliary tuberculosis are assumed to have depended on Boeck's sarcoid. Even if Boeck's sarcoid should prove to be a peculiar form of tuberculosis, it must be regarded as distinct from typical tuberculosis.